

حمل الآن

مجانا وحصريا

# المراجعة رقم (1)

## الترم الثاني



## G8 Final Revision on unit 1

### 1) Choose the correct answer:

- 1- All of the following are endothermic processes, except.....  
a) melting.                      b) sublimation.                      c) condensation.                      d) evaporation.
- 2- ..... indicates the occurrence of all exothermic processes.  
a) Formation of gas bubbles.  
b) No thermal change occurs.  
c) Increasing the temperature of the surrounding medium.  
d) Decreasing the temperature of the surrounding medium.
- 3- In the cooling cycle inside the refrigerator, the stage in which the heat is absorbed from the food is.....  
a) During the process of compressing the gas by the motor.  
b) While the coolant is expanding and evaporating inside the refrigerator.  
c) While the gas is condensing in the grid behind the refrigerator.  
d) During the transfer of heat to the surrounding medium (air).
- 4- The salt whose colour changes from blue to pink when drops of water are added to it is.....  
a)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .                      b)  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ .                      c)  $\text{CuSO}_4$ .                      d)  $\text{CoCl}_2$ .
- 5- ..... is accompanied by releasing thermal energy to the surrounding medium, when dissolved in water.  
a) Hydrated cobalt chloride.                      b) Sodium bicarbonate.  
c) Ammonium nitrate.                      d) Sodium hydroxide.
- 6- When magnesium sulphate (or calcium chloride) dissolves in water, the final temperature becomes ..... its initial temperature.  
a) lower than                      b) higher than                      c) equal to                      d) half
- 7- When adding drops of water to anhydrous copper sulphate,.....  
a) Energy is absorbed from the surrounding medium.  
b) Energy is released to the surrounding medium.  
c) The colour changes from blue to white.  
d) The colour changes from blue to pink.
- 8- The German scientist who proved that energy cannot be created or destroyed is.....  
a) Einstein                      b) Newton                      c) Hermann von Helmholtz                      d) Dalton
- 9- Self-heating cans contain .....  
a) slacked lime.                      b) quicklime.                      c) limestone.                      d) baking soda.
- 10- The molecular formula of limewater is.....  
a)  $\text{CaO}_{(s)}$                       b)  $\text{Ca(OH)}_{2(aq)}$                       c)  $\text{Ca(OH)}_{2(s)}$                       d)  $\text{CaCO}_{3(s)}$

- 11- All the following represents an exothermic reactions, except.....
- The reaction of aluminium with dilute hydrochloric acid.
  - The decomposition reaction of ozone gas in the atmosphere.
  - The reaction of sulphuric acid with sodium hydroxide.
  - The reaction of dilute hydrochloric acid with sodium carbonate.
- 12- In thermite reaction, the final temperature ( $T_2$ ) is ..... the initial temperature ( $T_1$ ).
- lower than
  - higher than
  - equal to
  - half
- 13- In endothermic reactions,.....
- the temperature of the surrounding medium increases.
  - the temperature of the surrounding medium decreases.
  - energy is released to the surrounding medium.
  - final temperature  $T_2$  is greater than initial temperature  $T_1$ .
- 14- All the following pairs of substances, when reacted together, leads to an increase in the temperature of the surroundings, except.....
- $\text{Al} + \text{Fe}_2\text{O}_3$
  - $\text{NH}_4\text{Cl} + \text{Ba}(\text{OH})_2$
  - $\text{Mg} + \text{HCl}$
  - $\text{NaOH} + \text{HCl}$
- 15- The non-renewable fuel which is the most used worldwide till now is.....
- fossil fuel
  - biofuel
  - synthetic fuel
  - hydrogen fuel
- 16- The combustion of a hydrocarbon in the air leads to the formation of.....
- carbon and hydrogen gas.
  - carbon and water vapour.
  - carbon dioxide gas and water vapour.
  - oxygen gas and water vapour.
- 17- All the following are materials used in fire extinguishing, except .....
- foam.
  - oxygen gas.
  - dry powder.
  - carbon dioxide gas.
- 18- The atmosphere consists of about .....oxygen gas.
- 87 %
  - 78 %
  - 21 %
  - 12 %
- 19- .....gas is used in fire extinguishers to isolate fires from air.
- $\text{O}_2$
  - $\text{CO}_2$
  - $\text{H}_2$
  - $\text{N}_2$
- 20- .....principle is used for extinguishing forest fires with water.
- Removing fuel
  - Smothering
  - Cooling
  - Isolating oxygen
- 21- The burning of wood is .....
- a decomposition reaction only.
  - a reduction reaction only.
  - an oxidation reaction only.
  - a redox reaction.
- 22- In the reaction  $(2\text{Mg} + \text{CO}_2 \xrightarrow{\Delta} 2\text{MgO} + \text{C}\downarrow)$ , Magnesium is.....
- reduced
  - reducing agent
  - decomposed
  - oxidizing agent

**2) Complete the following statements:**

- 1- The processes of material transformation and dissolution are ..... processes that are accompanied by .....or .....of energy to or from the surrounding medium.
- 2- According to thermal energy, the evaporation of alcohol is an ..... process, while the deposition process is an .....process.
- 3- According to thermal energy, the transformation of a substance from the solid state to the gaseous state is an .....process.
- 4- Freon passes through three stages during the refrigeration cycle in the refrigerator, which are expansion and ....., .....and .....
- 5- According to thermal energy, the dissolution of sodium carbonate salt in water is an .....process, while the dissolution of sodium bicarbonate salt in water is an .....process.
- 6- When adding drops of water to anhydrous copper sulphate, the colour changes from .....to .....
- 7- Substances that lower the temperature of water when dissolved such as ..... are described as .....
- 8- Hydrated cobalt chloride binds with .....molecules of water, while hydrated copper sulphate binds with .....molecules of water.
- 9- When diluting concentrated acids, .....is added to .....and not the opposite.
- 10- The amount of thermal energy released from the dissolution process is ..... proportional to the mass of solute when the volume of the solvent is constant.
- 11- Instant .....compresses are used only once to reduce swelling.
- 12- Instant .....compresses work to narrow blood vessels, while instant .....compresses work to expand the blood vessels.
- 13- In instant hot compresses the solute is ....., while in instant cold compresses the solute is .....
- 14- The .....energy stored in lemon juice is converted into ..... energy, fulfilling the law of conservation of .....
- 15- In exothermic reactions, the amount of released energy from forming new bonds in product molecules is ..... the amount of absorbed energy when breaking bonds in the reactant molecules.
- 16- The reaction of magnesium with dilute hydrochloric acid is an ..... and produces .....gas.
- 17- According to the accompanying thermal changes, breaking chemical bonds is an .....process, while forming chemical bonds is an .....process.



- 18- The molecular formula of quicklime is ....., while the molecular formula of slacked lime is .....
- 19- Luminous insects use the light produced from .....reactions inside their bodies for various purposes such as .....and .....
- 20- The main elements of the combustion process are ....., ..... and .....
- 21- Fuel combines with oxygen through an .....reaction, known as .....
- 22- .....and .....are examples of fossil fuel.
- 23- Ethyl alcohol (Ethanol) is example of .....and is prepared from plants rich in ....., like corn.
- 24- Natural gas consists mainly of 93 % .....gas and some other hydrocarbons like .....and .....
- 25- As a safety feature to alert users in the case of natural gas leaks, a very small amount of .....gas is added, which has a distinctive smell of .....
- 26- Hydrogen gas is an example of .....fuels and is described as .....fuel.
- 27- Fuel calorific value is measured by .....unit.
- 28- In the complete combustion, Bunsen flame turns ....., while in the incomplete combustion the flame turns .....
- 29- The main principles of the extinguishing triangle are ....., ..... and smothering (or isolating oxygen).
- 30- Cooling means reducing the temperature of burning materials such as paper and wood below their .....usually by using .....due to its high .....
- 31- The combustion of .....gas in pure oxygen produces ..... flame used in welding metals.
- 32- Oxidizing agent undergoes .....process, while reducing agent undergoes .....process.

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**3) Write the scientific term:**

- 1- A closed and repeated thermal process, in which heat is withdrawn from inside the refrigerator to the outside, using eco-friendly freons.
- 2- A physical change accompanied by the absorption of thermal energy from the surrounding medium when a substance dissolves in water.
- 3- Dissolution accompanied by a rise in the temperature of the surroundings.
- 4- Salts whose molecules are bonded to a specific number of water molecules.

- 5- The process in which the bonds in the molecules of reactants are broken and new bonds are formed in the molecules of products.
- 6- A diagram showing the path and changes of energy during a chemical reaction from reactants to products.
- 7- The reaction of heating aluminium with red iron oxide.
- 8- A flammable material used to produce thermal energy as a result of an exothermic reaction.
- 9- Ignition of materials without the presence of an external ignition source.
- 10- A flame produced from the ignition of a mixture of a gaseous fuel and oxygen.
- 11- A principle used for extinguishing sodium fires.
- 12- A chemical process in which the percentage of hydrogen increases in a substance.

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4) What is meant by:

1- Heat of dissolution.

➤ .....

2- Law of conservation of energy.

➤ .....

3- Fuel calorific value.

➤ .....

4- Combustion.

➤ .....

5- Ignition point.

➤ .....

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5) Put ( √ ) or ( x ):

- 1- The refrigeration cycle in the refrigerator includes internal endothermic processes and external exothermic processes ( )
- 2- The dissolution process is always exothermic. ( )
- 3- Hydrated substances turn into anhydrous substances by heating. ( )
- 4- Instant cold compresses help to relieve pain associated with muscle strain. ( )
- 5- Breaking bonds between the atoms of the reactant molecules is accompanied by absorbing heat energy from the surroundings. ( )
- 6- The greater the bond energy, the harder it is to break it. ( )

- 7- In endothermic reactions, heat transfers from the system to the surroundings. ( )
- 8- According to the accompanying thermal changes, the reaction of sodium carbonate with dilute hydrochloric acid is endothermic reaction. ( )
- 9- According to the accompanying thermal changes, the reaction of decomposition of calcium carbonate is endothermic reaction. ( )
- 10- Luminous insects emit light from the abdominal area as a result of exothermic reactions occurring inside their bodies. ( )
- 11- The reaction of iron with aluminium oxide is known as the thermite reaction. ( )
- 12- The combustion reaction is an endothermic reaction. ( )
- 13- Ethyl alcohol is prepared from plants rich in starch, so it is considered a renewable resource. ( )
- 14- The mixture of propane and butane gases is odorless. ( )
- 15- The calorific value of hydrogen fuel is the highest compared to the other types of fuel. ( )
- 16- Nitrogen gas is described as the fuel of the future. ( )
- 17- When the ignition point of the fuel is low, its flammability decreases. ( )
- 18- The Bunsen flame is used in cutting and welding metals. ( )
- 19- Oxyacetylene flame is a technological application for the combustion reaction of hydrocarbons. ( )
- 20- The reaction of glycerin with potassium permanganate powder is exothermic. ( )
- 21- Water is used in extinguishing petroleum oil fires. ( )
- 22- Gas valves are closed during fires to isolate oxygen. ( )
- 23- Redox reactions cause spoiling of food. ( )

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#### 6) Correct the underlined words:

- 1- The change of matter directly from the solid state to the gaseous state is called melting.
- 2- The refrigerator coolant liquid is Eco-friendly butane.
- 3- Dissolution of anhydrous lithium chloride in water is an endothermic chemical process.
- 4- The process of diluting concentrated sulphuric acid with water is an endothermic process.

- 5- In endothermic reactions, the amount of released energy from forming new bonds in product molecules is equal to the amount of absorbed energy when breaking bonds in the reactant molecules.
- 6- Self-heating cans contain calcium hydroxide and water.
- 7- The reaction of the formation of water from hydrogen and oxygen is an endothermic reaction.
- 8- Energy chain is a simple model that illustrates the three main elements of the combustion process.
- 9- Hydrogen gas is a main element in the combustion process.
- 10- Oven gas (Butagas) is a mixture of propane and acetylene.
- 11- The calorific value of wood is higher than the calorific value of hydrogen.
- 12- The atmosphere consists of about 21% nitrogen gas.
- 13- Oxygen gas that neither burns nor supports combustion.
- 14- The oxyacetylene flame is used to cut steel because its temperature reaches 2000°C, which is sufficient for it.
- 15- The colour of the Bunsen flame varies according to the amount of nitrogen mixed with the fuel.
- 16- Smothering principle is used for extinguishing fire resulting from natural gas leakage.
- 17- Water is used to extinguish fires of some metals like sodium and magnesium.
- 18- The density of petroleum oil is equal to the density of water.
- 19- Frying pan fires are extinguished by covering them with a plastic lid.

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**7) Cross out the odd word and write the scientific term of others:**

- 1- Freezing / Sublimation / Condensation / Deposition.  
➤ Scientific term: .....
- 2- Hydrated copper sulphate / Sodium bicarbonate / Anhydrous lithium chloride / Potassium sulphate.  
➤ Scientific term: .....
- 3- Coal / Petroleum oil / Natural gas / Ethanol.  
➤ Scientific term: .....
- 4- O<sub>2</sub> / CO<sub>2</sub> / Fuel / Heat.  
➤ Scientific term: .....
- 5- Removing fuel / Smothering / Cooling / Burning.  
➤ Scientific term: .....



**8) Mention the difference between (compare):**

- 1- Exothermic reactions and Endothermic reactions in terms of definition.
- 2- Instant cold compresses and instant hot compresses.
- 3- Bunsen flame and Oxyacetylene flame in terms of (way of production and uses).
- 4- Oxidation process and Reduction process.
- 5- Oxidizing agent and Reducing agent.

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**9) Give reason for:**

- 1- The transformation of a substance from one state to another is accompanied by a thermal change. (The dissolution process is accompanied by a thermal change.)  
➤ .....
- 2- The refrigerator works to preserve the food inside it from spoilage.  
(The cooling cycle of a refrigerator raises the temperature of the surrounding environment.)  
➤ .....
- 3- The sublimation process is an endothermic process.  
➤ .....
- 4- The dissolution of anhydrous lithium chloride salt in water is exothermic.  
.....
- 5- When you rub your hands with an antiseptic hand gel, you feel your hands are cold.  
➤ .....
- 6- When you rub your hands with laundry powder (washing powder) and water, you feel your hands are warm.  
➤ .....
- 7- Concentrated acids are diluted by dripping the acid onto the inner walls of a container with water, not the reverse.  
➤ .....
- 8- The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.  
➤ .....
- 9- Instant hot compresses used to relieve pain associated with muscle fatigue.  
➤ .....

- 10- Instant cold compresses used to reduce the severity of swelling.  
➤ .....
- 11- Chemical reactions usually involve thermal changes.  
➤ .....
- 12- The reaction of acids with alkalis is exothermic .  
(when acids react with alkalis the temperature of the surroundings increases.)  
➤ .....
- 13- The decomposition reaction is endothermic.  
(when barium hydroxide reacts with ammonium chloride, the temperature of the surroundings decreases.)  
➤ .....
- 14- Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.  
(You feel a cooling sensation in your mouth when you eat fizzy candy containing mixture of sodium bicarbonate and citric acid.)  
➤ .....
- 15- Coffee can be prepared in self-heating cans without the need for an external heat source.  
(Use of calcium oxide (quick lime) in self-heating packaging)  
➤ .....
- 16- The thermite reaction is used in railway welding.  
➤ .....
- 17- The use of biofuel is preferred over fossil fuel.  
➤ .....
- 18- Adding a very small percentage of ethanethiol gas to natural gas.  
➤ .....
- 19- The flame of a paraffin candle placed under a bell jar goes out in minutes.  
➤ .....
- 20- Ignition of a matchstick when it is struck against a rough surface.  
➤ .....
- 21- The combustion of carbohydrates produces carbon dioxide gas and water vapour.  
➤ .....
- 22- The oxyacetylene flame is used in cutting and welding metals.  
➤ .....
- 23- Water is used in extinguishing paper and wood fires.  
➤ .....

24- Frying pan fires are extinguished by covering them with a metal lid.

➤ .....

25- The presence of a bucket filled with sand in school laboratories.

➤ .....

26- Carbon dioxide gas is used in extinguishing fires.

➤ .....

27- Oxidation and reduction processes are two simultaneous processes.

➤ .....

28- Air evacuation preserves food for a longer period of time.

➤ .....

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### 10) What are the results of (What happens...)?

1- The dissolution of blue anhydrous cobalt chloride salt in water.

(adding water to anhydrous cobalt chloride)

➤ .....

2- Heating blue hydrated copper sulphate salt.

➤ .....

3- Doubling the mass of solute while keeping the volume of solvent constant.

➤ .....

4- Diluting concentrated hydrochloric acid by adding water to it.

(Adding water to concentrated sulphuric acid.)

➤ .....

5- Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.

➤ .....

6- The energy required to break the bonds in reactants exactly equal to the energy released from formation of new bonds in products.

➤ .....

7- Increasing the bond energy in the reactant molecules relative to their ease of breakage.

➤ .....

8- Magnesium strip reacts with dilute hydrochloric acid.

➤ .....

9- Pressing the lower button found in a self-heating can.

➤ .....

10- A chemical reaction occurs in which the energy released during bond formation is less than the energy absorbed to break the bonds.

➤ .....

11- The combustion of methane gas (or hydrocarbons) in the air.

➤ .....

12- Decreasing the amount of oxygen during the combustion of a benzene flame.

➤ .....

13- Complete combustion of acetylene gas in the presence of excess oxygen gas.

➤ .....

14- Adding drops of glycerin to potassium permanganate powder.

➤ .....

15- Water is used to extinguish a sodium fire.

➤ .....

16- Passing a stream of air over a powder of red-hot copper.

➤ .....

17- Hydrogen gas is passed over hot copper oxide.

➤ .....

\*\*\*\*\*

11) State one importance for each of the following:

1- Refrigeration cycle in the refrigerator (or eco-friendly freons).

.....

2- Pipes behind the refrigerator.

.....

3- Polystyrene cups.

.....

4- Self-heating cans.

.....

5- Thermite reaction.

.....

6- Ethyl alcohol.

.....

7- Natural gas and Butagas.

.....

8- Hydrogen fuel.

.....



## 9- Spark plugs (Bougie).

.....

## 10- Fire extinguishers.

.....

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## 12) Variant questions:

- 1- If the initial temperature  $T_1 = 20^\circ\text{C}$  and the final temperature  $T_2 = 15^\circ\text{C}$ , calculate the change in temperature  $\Delta T$  and determine the type of dissolution.

➤ .....

.....

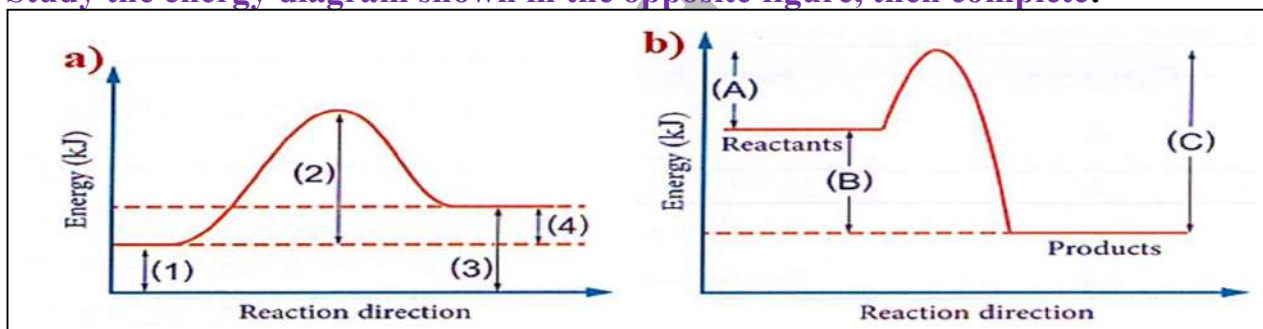
- 2- When dissolving 2 g of sodium hydroxide in 100 mL of water at a temperature of  $25^\circ\text{C}$ , the temperature of the solution became  $35^\circ\text{C}$ .

What is the expected change in temperature when dissolving 4 g of sodium hydroxide in the same amount of water.

➤ .....

.....

- 3- Study the energy diagram shown in the opposite figure, then complete:



- a) The energy diagram in figure (a) represents .....reaction, while that in figure (b) represents .....reaction.
- b) In figure (a), number ..... indicating the amount of energy absorbed from the surrounding medium in this reaction, while number .....indicating the amount of absorbed energy when breaking bonds in the reactant molecules.
- c) In figure (b), letter .....indicating the amount of energy released to the surrounding medium in this reaction, while letter .....indicating the amount of energy released from forming new bonds in product molecules.

- 4- The ignition point of substance (X) is 300°C, and the ignition point of substance (Y) is 45°C. Which substance ignites faster? Explain.

(**Explain:** The ignition point determines how dangerous the fuel is to use.)

➤ .....

.....

- 5- **Explain:** Bunsen flame has different colours.

➤ .....

.....

- 6- Two pieces of steel wool are burnt, one in pure oxygen and the other in atmospheric air. Determine in which of the two cases combustion is faster, with explanation.

➤ .....

.....

- 7- What happens with explanation when we invert over a burning candle a cylinder containing:

a) **Oxygen gas:** .....

b) **Carbon dioxide gas:** .....

- 8- **Explain:** It is strictly forbidden to use water in extinguishing both petroleum oil fires and sodium fires.

➤ .....

.....

.....

- 9- **In the reaction:**  $\text{Fe}_2\text{O}_3 + 3\text{CO} \xrightarrow{\Delta} 2\text{Fe} + 3\text{CO}_2$

Which substance is: oxidized, reduced, an oxidizing agent, a reducing agent.

➤ Substance that is oxidized: .....

➤ Substance that is reduced: .....

➤ Substance that is an oxidizing agent: .....

➤ Substance that is a reducing agent: .....

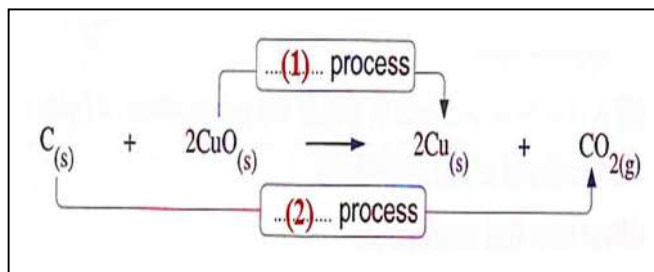
- 10- **Study the opposite figure, then answer:**

a) Identify process number (1) and (2).

And explain your answer.

➤ Process number (1) is .....  
because .....

➤ Process number (2) is .....  
because .....



b) Identify the oxidizing agent and reducing agent (with explanation).

➤ .....

## G8 Final Revision on unit 1 (answered)

### 1) Choose the correct answer:

- 1- All of the following are endothermic processes, except.....  
a) melting.                      b) sublimation.                      c) condensation.                      d) evaporation.
- 2- ..... indicates the occurrence of all exothermic processes.  
a) Formation of gas bubbles.  
b) No thermal change occurs.  
c) Increasing the temperature of the surrounding medium.  
d) Decreasing the temperature of the surrounding medium.
- 3- In the cooling cycle inside the refrigerator, the stage in which the heat is absorbed from the food is.....  
a) During the process of compressing the gas by the motor.  
b) While the coolant is expanding and evaporating inside the refrigerator.  
c) While the gas is condensing in the grid behind the refrigerator.  
d) During the transfer of heat to the surrounding medium (air).
- 4- The salt whose colour changes from blue to pink when drops of water are added to it is.....  
a)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .                      b)  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ .                      c)  $\text{CuSO}_4$ .                      d)  $\text{CoCl}_2$ .
- 5- .....is accompanied by releasing thermal energy to the surrounding medium, when dissolved in water.  
a) Hydrated cobalt chloride.                      b) Sodium bicarbonate.  
c) Ammonium nitrate.                      d) Sodium hydroxide.
- 6- When magnesium sulphate (or calcium chloride) dissolves in water, the final temperature becomes ..... its initial temperature.  
a) lower than                      b) higher than                      c) equal to                      d) half
- 7- When adding drops of water to anhydrous copper sulphate,.....  
a) Energy is absorbed from the surrounding medium.  
b) Energy is released to the surrounding medium.  
c) The colour changes from blue to white.  
d) The colour changes from blue to pink.
- 8- The German scientist who proved that energy cannot be created or destroyed is.....  
a) Einstein                      b) Newton                      c) Hermann von Helmholtz                      d) Dalton
- 9- Self-heating cans contain .....  
a) slacked lime.                      b) quicklime.                      c) limestone.                      d) baking soda.
- 10- The molecular formula of limewater is.....  
a)  $\text{CaO}_{(s)}$                       b)  $\text{Ca}(\text{OH})_{2(aq)}$                       c)  $\text{Ca}(\text{OH})_{2(s)}$                       d)  $\text{CaCO}_{3(s)}$

- 11- All the following represents an exothermic reactions, except.....
- The reaction of aluminium with dilute hydrochloric acid.
  - The decomposition reaction of ozone gas in the atmosphere.
  - The reaction of sulphuric acid with sodium hydroxide.
  - The reaction of dilute hydrochloric acid with sodium carbonate.
- 12- In thermite reaction, the final temperature ( $T_2$ ) is ..... the initial temperature ( $T_1$ ).
- lower than
  - higher than
  - equal to
  - half
- 13- In endothermic reactions,.....
- the temperature of the surrounding medium increases.
  - the temperature of the surrounding medium decreases.
  - energy is released to the surrounding medium.
  - final temperature  $T_2$  is greater than initial temperature  $T_1$ .
- 14- All the following pairs of substances, when reacted together, leads to an increase in the temperature of the surroundings, except.....
- $\text{Al} + \text{Fe}_2\text{O}_3$
  - $\text{NH}_4\text{Cl} + \text{Ba}(\text{OH})_2$
  - $\text{Mg} + \text{HCl}$
  - $\text{NaOH} + \text{HCl}$
- 15- The non-renewable fuel which is the most used worldwide till now is.....
- fossil fuel
  - biofuel
  - synthetic fuel
  - hydrogen fuel
- 16- The combustion of a hydrocarbon in the air leads to the formation of.....
- carbon and hydrogen gas.
  - carbon and water vapour.
  - carbon dioxide gas and water vapour.
  - oxygen gas and water vapour.
- 17- All the following are materials used in fire extinguishing, except .....
- foam.
  - oxygen gas.
  - dry powder.
  - carbon dioxide gas.
- 18- The atmosphere consists of about .....oxygen gas.
- 87 %
  - 78 %
  - 21 %
  - 12 %
- 19- .....gas is used in fire extinguishers to isolate fires from air.
- $\text{O}_2$
  - $\text{CO}_2$
  - $\text{H}_2$
  - $\text{N}_2$
- 20- .....principle is used for extinguishing forest fires with water.
- Removing fuel
  - Smothering
  - Cooling
  - Isolating oxygen
- 21- The burning of wood is .....
- a decomposition reaction only.
  - an oxidation reaction only.
  - a reduction reaction only.
  - a redox reaction.
- 22- In the reaction  $(2\text{Mg} + \text{CO}_2 \xrightarrow{\Delta} 2\text{MgO} + \text{C}\downarrow)$ , Magnesium is.....
- reduced
  - reducing agent
  - decomposed
  - oxidizing agent



## 2) Complete the following statements:

- 1- The processes of material transformation and dissolution are physical processes that are accompanied by release or absorption of energy to or from the surrounding medium.
- 2- According to thermal energy, the evaporation of alcohol is an endothermic process, while the deposition process is an exothermic process.
- 3- According to thermal energy, the transformation of a substance from the solid state to the gaseous state is an endothermic process.
- 4- Freon passes through three stages during the refrigeration cycle in the refrigerator, which are expansion and evaporation, compression and condensation.
- 5- According to thermal energy, the dissolution of sodium carbonate salt in water is an exothermic process, while the dissolution of sodium bicarbonate salt in water is an endothermic process.
- 6- When adding drops of water to anhydrous copper sulphate, the colour changes from white to blue.
- 7- Substances that lower the temperature of water when dissolved such as ammonium nitrate are described as endothermic.
- 8- Hydrated cobalt chloride binds with six molecules of water, while hydrated copper sulphate binds with five molecules of water.
- 9- When diluting concentrated acids, acid is added to water and not the opposite.
- 10- The amount of thermal energy released from the dissolution process is directly proportional to the mass of solute when the volume of the solvent is constant.
- 11- Instant cold compresses are used only once to reduce swelling.
- 12- Instant cold compresses work to narrow blood vessels, while instant hot compresses work to expand the blood vessels.
- 13- In instant hot compresses the solute is magnesium sulphate, while in instant cold compresses the solute is ammonium nitrate.
- 14- The chemical energy stored in lemon juice is converted into electrical energy, fulfilling the law of conservation of energy.
- 15- In exothermic reactions, the amount of released energy from forming new bonds in product molecules is greater than the amount of absorbed energy when breaking bonds in the reactant molecules.
- 16- The reaction of magnesium with dilute hydrochloric acid is an exothermic and produces hydrogen gas.
- 17- According to the accompanying thermal changes, breaking chemical bonds is an endothermic process, while forming chemical bonds is an exothermic process.



- 18- The molecular formula of quicklime is CaO<sub>(s)</sub>, while the molecular formula of slacked lime is Ca(OH)<sub>2(s)</sub>.
- 19- Luminous insects use the light produced from exothermic reactions inside their bodies for various purposes such as mating and self-defense.
- 20- The main elements of the combustion process are fuel, oxygen and heat.
- 21- Fuel combines with oxygen through an exothermic reaction, known as combustion.
- 22- Coal and petroleum oil are examples of fossil fuel.
- 23- Ethyl alcohol (Ethanol) is example of biofuel and is prepared from plants rich in starch, like corn.
- 24- Natural gas consists mainly of 93 % methane gas and some other hydrocarbons like propane and butane.
- 25- As a safety feature to alert users in the case of natural gas leaks, a very small amount of ethanethiol gas is added, which has a distinctive smell of garlic.
- 26- Hydrogen gas is an example of synthetic fuels and is described as future fuel.
- 27- Fuel calorific value is measured by kilojoules/gram (kJ/g) unit.
- 28- In the complete combustion, Bunsen flame turns blue, while in the incomplete combustion the flame turns yellow.
- 29- The main principles of the extinguishing triangle are fuel removal, cooling and smothering.
- 30- Cooling means reducing the temperature of burning materials such as paper and wood below their ignition point usually by using water due to its high specific heat.
- 31- The combustion of acetylene gas in pure oxygen produces oxyacetylene flame used in welding metals.
- 32- Oxidizing agent undergoes reduction process, while reducing agent undergoes oxidation process.

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### 3) Write the scientific term:

- 1- A closed and repeated thermal process, in which heat is withdrawn from inside the refrigerator to the outside, using eco-friendly freons. (Refrigeration cycle)
- 2- A physical change accompanied by the absorption of thermal energy from the surrounding medium when a substance dissolves in water. (Endothermic dissolution)
- 3- Dissolution accompanied by a rise in the temperature of the surroundings. (Exothermic dissolution)
- 4- Salts whose molecules are bonded to a specific number of water molecules. (Hydrated salts)

- 5- The process in which the bonds in the molecules of reactants are broken and new bonds are formed in the molecules of products. (Chemical reaction)
- 6- A diagram showing the path and changes of energy during a chemical reaction from reactants to products. (Energy diagram)
- 7- The reaction of heating aluminium with red iron oxide. (Thermite reaction)
- 8- A flammable material used to produce thermal energy as a result of an exothermic reaction. (Fuel)
- 9- Ignition of materials without the presence of an external ignition source. (Spontaneous combustion)
- 10- A flame produced from the ignition of a mixture of a gaseous fuel and oxygen. (Bunsen flame)
- 11- A principle used for extinguishing sodium fires. (Smothering)
- 12- A chemical process in which the percentage of hydrogen increases in a substance. (Reduction)

\*\*\*\*\*

#### 4) What is meant by:

##### 1- Heat of dissolution.

- The amount of heat absorbed or released when dissolving a specific quantity of solute in a known volume of solvent to form a solution.

##### 2- Law of conservation of energy.

- Energy is neither destroyed nor created from nothing, but it can be converted from one form to another.

##### 3- Fuel calorific value.

- It is the amount of energy produced from the combustion of 1 g of fuel in excess of oxygen gas.

##### 4- Combustion.

- It is the combination of fuel with oxygen which is usually accompanied by the emission of light, heat, or both.

##### 5- Ignition point.

- It is the temperature at which the material (fuel) begins to burn.

\*\*\*\*\*

#### 5) Put (✓) or (x):

- 1- The refrigeration cycle in the refrigerator includes internal endothermic processes and external exothermic processes (✓)
- 2- The dissolution process is always exothermic. (x)

- 3- Hydrated substances turn into anhydrous substances by heating. (✓)
- 4- Instant cold compresses help to relieve pain associated with muscle strain. (x)
- 5- Breaking bonds between the atoms of the reactant molecules is accompanied by absorbing heat energy from the surroundings. (✓)
- 6- The greater the bond energy, the harder it is to break it. (✓)
- 7- In endothermic reactions, heat transfers from the system to the surroundings. (x)
- 8- According to the accompanying thermal changes, the reaction of sodium carbonate with dilute hydrochloric acid is endothermic reaction. (x)
- 9- According to the accompanying thermal changes, the reaction of decomposition of calcium carbonate is endothermic reaction. (✓)
- 10- Luminous insects emit light from the abdominal area as a result of exothermic reactions occurring inside their bodies. (✓)
- 11- The reaction of iron with aluminium oxide is known as the thermite reaction. (x)
- 12- The combustion reaction is an endothermic reaction. (x)
- 13- Ethyl alcohol is prepared from plants rich in starch, so it is considered a renewable resource. (✓)
- 14- The mixture of propane and butane gases is odorless. (✓)
- 15- The calorific value of hydrogen fuel is the highest compared to the other types of fuel. (✓)
- 16- Nitrogen gas is described as the fuel of the future. (x)
- 17- When the ignition point of the fuel is low, its flammability decreases. (x)
- 18- The Bunsen flame is used in cutting and welding metals. (x)
- 19- Oxyacetylene flame is a technological application for the combustion reaction of hydrocarbons. (✓)
- 20- The reaction of glycerin with potassium permanganate powder is exothermic. (✓)
- 21- Water is used in extinguishing petroleum oil fires. (x)
- 22- Gas valves are closed during fires to isolate oxygen. (x)
- 23- Redox reactions cause spoiling of food. (✓)

\*\*\*\*\*

#### 6) Correct the underlined words:

- 1- The change of matter directly from the solid state to the gaseous state is called melting. (Sublimation)
- 2- The refrigerator coolant liquid is Eco-friendly butane. (freons)

- 3- Dissolution of anhydrous lithium chloride in water is an endothermic chemical process. (exothermic physical)
- 4- The process of diluting concentrated sulphuric acid with water is an endothermic process. (exothermic)
- 5- In endothermic reactions, the amount of released energy from forming new bonds in product molecules is equal to the amount of absorbed energy when breaking bonds in the reactant molecules. (less than)
- 6- Self-heating cans contain calcium hydroxide and water. (calcium oxide)
- 7- The reaction of the formation of water from hydrogen and oxygen is an endothermic reaction. (exothermic)
- 8- Energy chain is a simple model that illustrates the three main elements of the combustion process. (Combustion Triangle)
- 9- Hydrogen gas is a main element in the combustion process. (Oxygen)
- 10- Oven gas (Butagas) is a mixture of propane and acetylene. (butane)
- 11- The calorific value of wood is higher than the calorific value of hydrogen. (less than)
- 12- The atmosphere consists of about 21% nitrogen gas. (78 %)
- 13- Oxygen gas that neither burns nor supports combustion. (Carbon dioxide)
- 14- The oxyacetylene flame is used to cut steel because its temperature reaches 2000°C, which is sufficient for it. (3000)
- 15- The colour of the Bunsen flame varies according to the amount of nitrogen mixed with the fuel. (oxygen)
- 16- Smothering principle is used for extinguishing fire resulting from natural gas leakage. (Fuel removal)
- 17- Water is used to extinguish fires of some metals like sodium and magnesium. (Sand)
- 18- The density of petroleum oil is equal to the density of water. (less than)
- 19- Frying pan fires are extinguished by covering them with a plastic lid. (metal lid)

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### 7) Cross out the odd word and write the scientific term of others:

- 1- Freezing / Sublimation / Condensation / Deposition.  
➤ Scientific term: **Exothermic processes.**
- 2- Hydrated copper sulphate / Sodium bicarbonate / Anhydrous lithium chloride / Potassium sulphate.  
➤ Scientific term: **Solutes whose dissolution in water are endothermic.**



3- Coal / Petroleum oil / Natural gas / Ethanol.

➤ Scientific term: **Fossil fuel**.

4-  $O_2$  /  $CO_2$  / Fuel / Heat.

➤ Scientific term: **key elements of the combustion process**.

5- Removing fuel / Smothering / Cooling / Burning.

➤ Scientific term: **principles of extinguishing fire**.

\*\*\*\*\*

8) **Mention the difference between (compare):**

1- **Exothermic reactions and Endothermic reactions in terms of definition.**

| Exothermic reactions                                                                                                                                    | Endothermic reactions                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| They are reactions that result in the release of thermal energy, as a product of the reaction to the surroundings, causing its temperature to increase. | They are reactions that require the absorption of thermal energy from the surroundings, causing its temperature to decrease. |

2- **Instant cold compresses and instant hot compresses.**

| P.O.C.         | Instant cold compresses                  | Instant hot compresses                                        |
|----------------|------------------------------------------|---------------------------------------------------------------|
| Solute         | Ammonium nitrate                         | Magnesium sulphate                                            |
| Thermal change | Endothermic dissolution                  | Exothermic dissolution.                                       |
| Use            | Used to reduce the severity of swelling. | Used to relieve pain associated with muscle fatigue (strain). |

3- **Bunsen flame and Oxyacetylene flame in terms of (way of production and uses).**

| P.O.C.            | Bunsen flame                                        | Oxyacetylene flame                                           |
|-------------------|-----------------------------------------------------|--------------------------------------------------------------|
| Way of production | Combustion of a mixture of gaseous fuel and oxygen. | Combustion of acetylene gas in pure oxygen.                  |
| Use               | Used as a heat source in laboratories .             | Used in welding and cutting metals such as steel and copper. |

4- **Oxidation process and Reduction process.**

| Oxidation process                                                                       | Reduction process                                                                       |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| A chemical process in which the percentage of oxygen <b>increases</b> in a substance.   | A chemical process in which the percentage of oxygen <b>decreases</b> in a substance.   |
| A chemical process in which the percentage of hydrogen <b>decreases</b> in a substance. | A chemical process in which the percentage of hydrogen <b>increases</b> in a substance. |

## 5- Oxidizing agent and Reducing agent.

| Oxidizing agent                                                                                                 | Reducing agent                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| It is the substance that gives oxygen to (or takes hydrogen from) another substance during a chemical reaction. | It is the substance that takes oxygen from (or gives hydrogen to) another substance during a chemical reaction. |

\*\*\*\*\*

### 9) Give reason for:

- 1- The transformation of a substance from one state to another is accompanied by a thermal change. (The dissolution process is accompanied by a thermal change.)
  - Because it is accompanied by a loss or gain of thermal energy to or from the surroundings.
- 2- The refrigerator works to preserve the food inside it from spoilage. (The cooling cycle of a refrigerator raises the temperature of the surrounding environment.)
  - Because it cools the food inside it by continuously transferring heat from inside the refrigerator to its outside using the refrigerant (freons).
- 3- The sublimation process is an endothermic process.
  - Because it is accompanied by absorption (gain) of thermal energy from the surroundings.
- 4- The dissolution of anhydrous lithium chloride salt in water is exothermic.
  - Because it is accompanied by a release (loss) of thermal energy to the surroundings. (Because it is accompanied by an increase in the temperature of the solution.)
- 5- When you rub your hands with an antiseptic hand gel, you feel your hands are cold.
  - Due to the absorption of heat from the hands during the evaporation of alcohol present in the hand gel.
- 6- When you rub your hands with laundry powder (washing powder) and water, you feel your hands are warm.
  - Due to the release of heat to the hand during the dissolution of laundry powder (washing powder) in water.
- 7- Concentrated acids are diluted by dripping the acid onto the inner walls of a container with water, not the reverse.
  - Because adding acid to water allows the water to absorb the released heat without causing damage.
- 8- The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.
  - Because by increasing the mass of the dissolved salt, the amount of change in temperature increases and vice versa.

9- Instant hot compresses used to relieve pain associated with muscle fatigue.

- Because it causes widening the blood vessels, which increases blood flow to the stressed areas, causing relaxing the contracting muscles.

10- Instant cold compresses used to reduce the severity of swelling.

- Because it causes narrowing the blood vessels, which reduces blood flow to the injured area.

11- Chemical reactions usually involve thermal changes.

- Because usually the amounts of thermal energy absorbed and released in the processes of breaking and forming bonds for the same reaction are not equal, so energy is absorbed or released from or to the surroundings, to fulfill the law of conservation of energy.

12- The reaction of acids with alkalis is exothermic .

(when acids react with alkalis the temperature of the surroundings increases.)

- Because the amount of released energy from forming new bonds in product molecules is greater than the amount of absorbed energy when breaking bonds in the reactant molecules, thus result in the release of thermal energy to the surroundings.

13- The decomposition reaction is endothermic.

(when barium hydroxide reacts with ammonium chloride, the temperature of the surroundings decreases.)

- Because the amount of released energy from forming new bonds in product molecules is less than the amount of absorbed energy when breaking bonds in the reactant molecules, thus result in the absorption of thermal energy from the surroundings.

14- Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.

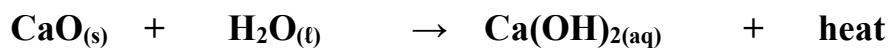
(You feel a cooling sensation in your mouth when you eat fizzy candy containing mixture of sodium bicarbonate and citric acid.)

- Because the reaction is endothermic and is accompanied by absorption of thermal energy from the surroundings, so the temperature of the surroundings decreases.

15- Coffee can be prepared in self-heating cans without the need for an external heat source.

(Use of calcium oxide (quick lime) in self-heating packaging)

- Because an exothermic reaction occurs between calcium oxide and water, that releasing heat used in warming coffee.



**16- The thermite reaction is used in railway welding.**

- Because an exothermic reaction occurs between aluminium and red iron oxide, that releasing heat used in melting of iron produced from the reaction.



**17- The use of biofuel is preferred over fossil fuel.**

- Because biofuel is a renewable resource, while fossil fuel is a non-renewable resource.

**18- Adding a very small percentage of ethanethiol gas to natural gas.**

- To facilitate the detection of gas leaks due to its characteristic garlic-like smell, while natural gas is odorless.

**19- The flame of a paraffin candle placed under a bell jar goes out in minutes.**

- Because the fire triangle is incomplete, due to the depletion of oxygen gas.

**20- Ignition of a matchstick when it is struck against a rough surface.**

- Because friction generates heat which starts an exothermic reaction.

**21- The combustion of carbohydrates produces carbon dioxide gas and water vapour.**

- Because hydrocarbons are organic compounds that composed of carbon and hydrogen only.

**22- The oxyacetylene flame is used in cutting and welding metals.**

- Because the temperature of oxyacetylene flame reaches 3000°C which is sufficient for that.

**23- Water is used in extinguishing paper and wood fires.**

- Due to its high specific heat which allows it to absorb a large amount of thermal energy and thus the temperature of the burning materials decreases.

**24- Frying pan fires are extinguished by covering them with a metal lid.**

- To isolate oxygen and thus the fire triangle is incomplete.

**25- The presence of a bucket filled with sand in school laboratories.**

- To extinguish fires of some metals such as sodium and magnesium by isolating them from oxygen.

**26- Carbon dioxide gas is used in extinguishing fires.**

- Because it is a gas that doesn't burn and doesn't support combustion.

**27- Oxidation and reduction processes are two simultaneous processes.**

- Because when a substance gains oxygen (is oxidized), another substance must lose this oxygen (is reduced) at the same time.

**28- Air evacuation preserves food for a longer period of time.**

- Because it provides a poor-oxygen environment that reduces redox reactions which lead to spoiling of food.



## 10) What are the results of (What happens...)?

### 1- The dissolution of blue anhydrous cobalt chloride salt in water.

(adding water to anhydrous cobalt chloride)

- The temperature of the surroundings increases, and it turns into pink hydrated cobalt chloride.

### 2- Heating blue hydrated copper sulphate salt.

- The temperature of the surroundings decreases. and it turns into white anhydrous copper sulphate.

### 3- Doubling the mass of solute while keeping the volume of solvent constant.

- The temperature changes by a constant amount.

### 4- Diluting concentrated hydrochloric acid by adding water to it.

(Adding water to concentrated sulphuric acid.)

- It causes severe damage due to releasing a large amount of thermal energy, leading to violent boiling of the water and splashing of acid outside.

### 5- Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.

- The stored chemical energy in lemon juice is converted into electrical energy, so the bulb lights up.

### 6- The energy required to break the bonds in reactants exactly equal to the energy released from formation of new bonds in products.

- The reaction will be thermally stable and not accompanied by thermal changes (reaction not be exothermic or endothermic).

### 7- Increasing the bond energy in the reactant molecules relative to their ease of breakage.

- The greater the bond energy, the harder it is to break them.

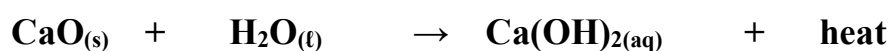
### 8- Magnesium strip reacts with dilute hydrochloric acid.

- An amount of thermal energy is released and the temperature of the surroundings increases as a result of an exothermic reaction.



### 9- Pressing the lower button found in a self-heating can.

- The thin membrane ruptures and an exothermic chemical reaction occurs between calcium oxide and water, forming calcium hydroxide solution (limewater) with the release of heat.



**10- A chemical reaction occurs in which the energy released during bond formation is less than the energy absorbed to break the bonds.**

➤ The reaction absorbs thermal energy equal to the difference between the amount of released energy and absorbed energy; thus the reaction is endothermic.

**11- The combustion of methane gas (or hydrocarbons) in the air.**

➤ Carbon dioxide gas and water vapour are formed as products of an exothermic reaction.

**12- Decreasing the amount of oxygen during the combustion of a benzene flame,**

➤ Incomplete combustion occurs and the flame turns yellow.

**13- Complete combustion of acetylene gas in the presence of excess oxygen gas.**

➤ The oxyacetylene flame is produced.

**14- Adding drops of glycerin to potassium permanganate powder.**

➤ Spontaneous exothermic reaction occurs, leading to emission of smoke and formation of a purple-coloured flame.

**15- Water is used to extinguish a sodium fire.**

➤ Exothermic reaction occurs between sodium and water, that causes burning of the released hydrogen gas, so the fire intensity increases.

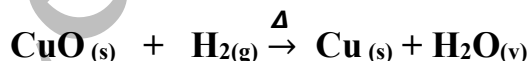
**16- Passing a stream of air over a powder of red-hot copper.**

➤ Copper is oxidized forming black copper oxide.



**17- Hydrogen gas is passed over hot copper oxide.**

➤ Copper oxide is reduced forming reddish-brown copper.



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**11) State one importance for each of the following:**

**1- Refrigeration cycle in the refrigerator (or eco-friendly freons):** it cools the food inside the refrigerator by continuously transferring heat from inside the refrigerator to its outside.

**2- Pipes behind the refrigerator:** are used to cool hot gas passes through them to be liquid again (exothermic process).

**3- Polystyrene cups:** are used to increase thermal insulation in laboratory experiments.

**4- Self-heating cans:** Cans used for preparing coffee or heating the food inside by using released heat from the reaction inside it without the need for external heat source.

**5- Thermite reaction:** It is used in welding the railway tracks.

**6- Ethyl alcohol:** is mixed with gasoline to be used as car fuel in some countries.

**7- Natural gas and Butagas:** are the main fossil fuels used in households.

- 8- **Hydrogen fuel:** is used as fuel for cars and trucks powered by hydrogen fuel cells.
- 9- **Spark plugs (Bougie):** tool used in cars when starting the car engine to create an electric spark that causes the ignition of gasoline-air mixture in the combustion chambers.
- 10- **Fire extinguishers:** Used to extinguish fires by isolating fires from oxygen.

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## 12) Variant questions:

- 1- If the initial temperature  $T_1 = 20^\circ\text{C}$  and the final temperature  $T_2 = 15^\circ\text{C}$ , calculate the change in temperature  $\Delta T$  and determine the type of dissolution.

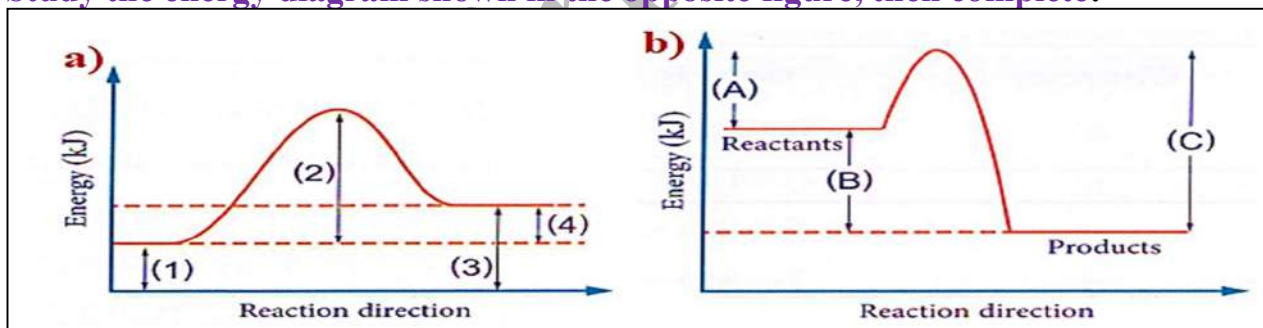
- $\Delta T = T_2 - T_1 = 15 - 20 = -5^\circ\text{C}$ .
- The type of dissolution: endothermic.

- 2- When dissolving 2 g of sodium hydroxide in 100 mL of water at a temperature of  $25^\circ\text{C}$ , the temperature of the solution became  $35^\circ\text{C}$ .

What is the expected change in temperature when dissolving 4 g of sodium hydroxide in the same amount of water.

- The change in temperature when dissolving (2 g) =  $T_2 - T_1 = 35 - 25 = 10^\circ\text{C}$
- When doubling the mass of solute the temperature changes by a constant amount ( $10^\circ\text{C}$ ), so the expected change in temperature =  $35 + 10 = 45^\circ\text{C}$ .

- 3- Study the energy diagram shown in the opposite figure, then complete:



- a) The energy diagram in figure (a) represents endothermic reaction, while that in figure (b) represents exothermic reaction.
- b) In figure (a), number (4) indicating the amount of energy absorbed from the surrounding medium in this reaction, while number (2) indicating the amount of absorbed energy when breaking bonds in the reactant molecules.
- c) In figure (b), letter (B) indicating the amount of energy released to the surrounding medium in this reaction, while letter (C) indicating the amount of energy released from forming new bonds in product molecules.

4- The ignition point of substance (X) is 300°C, and the ignition point of substance (Y) is 45°C. Which substance ignites faster? Explain.

(**Explain:** The ignition point determines how dangerous the fuel is to use.)

- The substance (Y).
- Because as the ignition point of a fuel decreases, its flammability increases and the fuel ignites faster.

5- **Explain:** Bunsen flame has different colours.

- The flame colour varies according to the amount of oxygen mixed with the fuel as following:

When the amount of oxygen is limited, the flame turns **yellow**.

When the amount of oxygen is abundant, the flame turns **blue**.

6- Two pieces of steel wool are burnt, one in pure oxygen and the other in atmospheric air. Determine in which of the two cases combustion is faster, with explanation.

- The piece of steel wool burns faster in pure oxygen than that in atmospheric air.
- Because the concentration of oxygen gas in pure oxygen is greater than that in atmospheric air, and the rate of combustion increases by increasing the concentration of oxygen gas.

7- What happens with explanation when we invert over a burning candle a cylinder containing:

- Oxygen gas:** The candle continues to burn / Due to the abundance of oxygen gas which supports burning.
- Carbon dioxide gas:** The candle flame goes out quickly/Because carbon dioxide gas doesn't burn and doesn't support burning.

8- **Explain:** It is strictly forbidden to use water in extinguishing both petroleum oil fires and sodium fires.

- Water isn't used to extinguish petroleum oil fires, because density of oil is lower than that of water, so oil floats on top of water causing the fire to spread instead of being extinguished.
- Water isn't used to extinguish sodium fires, because the reaction of these metals with water is exothermic, that causes burning of the released hydrogen gas.

9- In the reaction:  $\text{Fe}_2\text{O}_3 + 3\text{CO} \xrightarrow{\Delta} 2\text{Fe} + 3\text{CO}_2$

Which substance is: oxidized, reduced, an oxidizing agent, a reducing agent.

- Substance that is oxidized: **CO**.
- Substance that is reduced: **Fe<sub>2</sub>O<sub>3</sub>**.
- Substance that is an oxidizing agent: **Fe<sub>2</sub>O<sub>3</sub>**.
- Substance that is a reducing agent: **CO**.

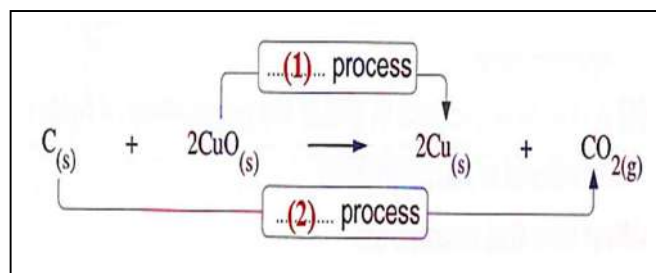


10- Study the opposite figure, then answer:

a) Identify process number (1) and (2).

And explain your answer.

- Process number (1) is **reduction**, because the percentage of oxygen decreases.
- Process number (2) is **oxidation**, because the percentage of oxygen increases.



b) Identify the oxidizing agent and reducing agent (with explanation).

- The **oxidizing agent** is copper oxide ( $CuO$ ), because it gives oxygen to carbon ( $C$ ).
- The **reducing agent** is carbon, because it takes oxygen from copper oxide.

## G8 Final Revision on unit 2

### 1) Choose the correct answer:

- 1- All the following include scalar physical quantities, except.....  
a) acceleration                      b) distance                      c) time                      d) mass
- 2- .....believed that objects do not continue in motion unless a force acted continuously on them..  
a) Galileo                      b) Mendeleev                      c) Aristotle                      d) Newton
- 3- The scientist ..... studied the velocity of sound in air.  
a) Galileo                      b) Mendeleev                      c) Aristotle                      d) Newton
- 4- If balanced forces act on a moving object, its velocity.....  
a) increases                      b) decreases                      c) remains constant                      d) becomes zero
- 5- If two forces of (6 N, 6N) act on a stationary object in the same direction, then the net force acting on the object equals.....  
a) zero                      b) 6 N                      c) 12 N                      d) 36 N
- 6- A person tried to push a box of mass 50 kg placed on a rough horizontal surface but he could not, this means that the net force acting on the box equals.....  
a) zero                      b) 25 N                      c) 50 N                      d) 100 N
- 7- When a stationary bus moves forward suddenly, its passengers are rushed.....  
a) to right                      b) to left                      c) forward                      d) backward
- 8- ..... is the distance travelled by the moving object during the stopping time.  
a) Acceleration                      b) Stopping distance                      c) Velocity                      d) Force
- 9- The air hockey game represents a technological application of.....  
a) Newton's first law                      b) Newton's second law  
c) Newton's third law                      d) law of gravitation
- 10- All the following are cases in which the object moves with acceleration, except when its.....  
a) velocity increases over time.                      b) velocity decreases over time.  
c) velocity is constant.                      d) direction of motion changes.
- 11- When the net force acting on the object increases to double and its mass decreases to half the acceleration of a moving object.....its value.  
a) increases to double.                      b) increases four times.  
c) decreases to half.                      d) decreases to quarter.
- 12- .....protects the driver from hitting the windshield of a moving car when the brakes are applied suddenly.  
a) Seat belt                      b) Inertia                      c) Speedometer                      d) Cruise control

- 13- .....explains the relationship between force, mass, and acceleration.**  
a) Newton's first law  
b) Newton's second law  
c) Newton's third law  
d) law of gravitation
- 14- When the net force acting on the object decreases to half and its mass increases to double the acceleration of a moving object.....its value.**  
a) increases to double.  
b) increases four times.  
c) decreases to half.  
d) decreases to quarter.
- 15- The backward movement of the cannon when the shell is propelled forward represents an application of .....**  
a) Newton's first law  
b) Newton's second law  
c) Newton's third law  
d) law of gravitation
- 16- A ball of mass 2 kg moving at a velocity of 3 m/s collides inelastically with another stationary ball of the same mass, the velocity at which the two balls move together after collision equals.....**  
a) 1.5 m/s  
b) 3 m/s  
c) 6 m/s  
d) 9 m/s
- 17- .....are used together to multiply force or increase speed.**  
a) Gears and belts  
b) Wheel and axle  
c) Wheel and ramp  
d) Gears and axle
- 18- All the following represent third class levers, except.....**  
a) tennis racket  
b) hand broom  
c) tweezers  
d) nutcracker
- 19- .....represents a first class lever that doesn't save effort.**  
a) Pliers  
b) Nutcracker  
c) Seesaw  
d) Coal tongs
- 20- .....is from examples of third class levers that increase speed.**  
a) Tennis racket  
b) Nutcracker  
c) Seesaw  
d) Coal tongs
- 21- A lever lifts a load weighing 400 N with an effort of 100 N, so its mechanical advantage is.....**  
a) 0.25  
b) 4  
c) 8  
d) 40
- 22- If the mechanical advantage of a lever equals 5, the effort required to lift a load its weight is 500 N equals.....**  
a) 50 N  
b) 100 N  
c) 500 N  
d) 2500 N
- 23- .....lever always has a mechanical advantage greater than 1.**  
a) Tweezers  
b) Wheelbarrow  
c) Seesaw  
d) Coal tongs
- 24- All the following levers don't save effort, except.....**  
a) scissors  
b) seesaw  
c) lemon squeezer  
d) tennis racket

**2) Complete the following statements:**

- 1- Mass is a .....physical quantity, while acceleration is a ..... physical quantity.
- 2- Force is a .....physical quantity that is fully defined by both ..... and .....
- 3- Force is measured in .....units by a device called .....
- 4- The scientist who made important contributions in the field of optics is .....
- 5- If two forces acting on an object are .....in magnitude and ..... in direction along the same line of action, the net force is zero.
- 6- If the resultant force is not equal to zero, so the forces are .....
- 7- The passengers of the bus are rushed .....when it stops suddenly according to Newton's .....law.
- 8- As the mass of the stationary object increases, its inertia .....
- 9- The stopping distance is .....proportional to the mass of the object.
- 10- When the velocity of an object increases or decreases, the object acquires .....
- 11- Acceleration is measured in the unit .....which is equivalent to .....
- 12- As the mass of the object increases, its acceleration .....at constant net force.
- 13- The acceleration with which an object moves is .....proportional to the net force acting on it.
- 14- It is recommended to wear a .....when driving a car.
- 15- The .....works with the seat belt to .....the rate of change in velocity when the brakes are applied.
- 16- Among the properties of the action force and reaction force is that they are .....in magnitude and .....in direction.
- 17- Launching a rocket in a direction opposite to that of the expelled gases is explained by .....law.
- 18- When a collision occurs between two identical masses with a loss of kinetic energy, the collision is known as ....., while if there is no loss of kinetic energy, the collision is known as .....
- 19- Elastic collision is the collision that keeps both body's ..... and body's.....
- 20- A ball (X) of mass 1 kg moving at a velocity of 4 m/s collides elastically with a stationary ball (Y) having the same mass, so after the collision the velocity of ball (X) becomes .....while the velocity of ball (Y) becomes .....
- 21- In inelastic collision, a loss of energy occurs in the form of .....or .....
- 22- .....and .....are used in bicycles to transfer motion and change speed.



- 23- The tower crane is a .....machine, while levers are .....machines.
- 24- Load arm is the distance between the applied force and the .....
- 25- The product of multiplying the load by its arm is called .....
- 26- The ..... of a lever determines how much it saves effort.
- 27- The lever is at equilibrium when the moment of load .....the moment of effort.
- 28- The lever saves effort when its mechanical advantage is .....one.
- 29- In .....class levers the load is located between the fulcrum and the effort such as .....
- 30- All .....class levers save effort.
- 31- The effort arm is equal to the load arm in the .....class levers, such as.....
- 32- The crowbar is a .....class lever, while the manual broom is a.....class lever.
- 33- Increasing the length of the effort arm leads to .....the required effort, thus the mechanical advantage .....
- 34- In the human body, the .....represent fulcrum, while contraction force of muscles represents the .....
- 35- In the human body, the head represents a .....class lever, while the forearm represents a .....class lever.
- 36- At the lever equilibrium, when the effort arm is longer than the load arm, the load is ..... the effort.

\*\*\*\*\*

### 3) Write the scientific term:

- 1- The scientist who formulated the laws of motion and the universal law of gravitation.
- 2- The property of the body resistance to changing its dynamic state.
- 3- The time taken for the moving object to stop.
- 4- The rate of change of velocity.
- 5- It allows the user to fly in the air upwards as the water rushes down through its openings.
- 6- It works by pushing air from its motor downwards, which is followed by pushing it upwards with equal force.
- 7- A means used by man to save time or effort or both while performing tasks.
- 8- A simple machine that is used to change the direction of force during lifting or lowering weights.

- 9- It is a rigid rod, either straight or curved, that is pivoted on a fixed point.
- 10- The distance between the load and the fulcrum.
- 11- A fixed point on which a rigid bar rests.
- 12- The product of multiplying the effort by its arm.
- 13- A lever whose fulcrum is located between the effort and the load.
- 14- Levers don't always save effort, but they are used in precise and dangerous tasks.

\*\*\*\*\*

#### 4) What is meant by (define):

- 1- Net force (Resultant force).

➤ .....

- 2- Newton's first law (Law of Inertia).

➤ .....

- 3- Inertia.

➤ .....

- 4- Acceleration.

➤ .....

- 5- The net force acting on an object of mass 2 kg equals 10 N.

➤ .....

- 6- Newton's Third Law.

➤ .....

- 7- Simple machines.

➤ .....

- 8- Law of levers.

➤ .....

- 9- Mechanical advantage of lever.

➤ .....

\*\*\*\*\*

#### 5) Put ( ✓ ) or ( x ):

- 1- The forces acting on an object are described as balanced when their resultant ( ) forces are zero.
- 2- A box placed on the top of a moving car will move backward when the car stops suddenly. ( )
- 3- The greater the inertia of a moving object, the shorter the stopping time and the stopping distance when using the brakes. ( )
- 4- The greater the inertia of a moving object, the harder for it to be stopped. ( )

- 5- The greater the net force acting on the object, the less its acceleration at constant mass. ( )
- 6- The acceleration at which a car of mass 1000 kg moves when the engine force is 1300 N equals 2 m/s<sup>2</sup>. ( )
- 7- The flyboard is a life application of Newton's third law. ( )
- 8- The action force and reaction force act without any time difference. ( )
- 9- The forces of action and reaction act on the same body and therefore do not cancel each other out. ( )
- 10- The wedge is used to change the direction of the applied force. ( )
- 11- The most common type of levers are first class levers. ( )
- 12- Pliers represent third class lever and save effort. ( )
- 13- While Standing on the tiptoes, the foot represents a second class lever. ( )
- 14- Third class levers always save effort. ( )
- 15- Scissors are first class lever and can save effort. ( )
- 16- The bones that make up the skeletal system are levers. ( )

\*\*\*\*\*

6) Correct the underlined words:

- 1- Aristotle explained that that objects tend to maintain their state of rest or motion unless acted upon by an external force.
- 2- The scientist Galileo discovers gravity.
- 3- If two forces act in opposite direction along same line of action, the resultant is the sum of the two forces.
- 4- Newton's second law is known as Law of Inertia.
- 5- Speedometer works to maintain the constant velocity of cars without direct driver intervention.
- 6- The direction of acceleration is always in the opposite direction as the net force.
- 7- The acceleration of a moving object is directly proportional to its mass at constant net force.
- 8- The action force and reaction force always act on one object.
- 9- In drones, the downward push of air from the engines represents the reaction force.
- 10- In elastic collision between two objects, the relative velocity of the two objects after the collision is greater than their relative velocity before collision.
- 11- There are only two types of levers.

- 12- Law of gravitation explains the relation between effort and load at equilibrium of lever.
- 13- The levers are described as being at equilibrium when the moment of effort less than the moment of load.
- 14- In second class levers, the effort arm equals the load arm.
- 15- All second class levers change direction.
- 16- Soda water opener is a first class lever.
- 17- In first class lever the effort is located between the fulcrum and the load.
- 18- The fishing rod is one of the second type of levers
- 19- Scissors are third class levers that used to avoid the risk of burns.
- 20- If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to 25 cm.

\*\*\*\*\*

7) Cross out the odd word and write the scientific term of others:

- 1- Acceleration / Force / Velocity / Time.  
➤ Scientific term: .....
- 2- Load / Fulcrum / Flyboard / Effort.  
➤ Scientific term: .....
- 3- Pulley / Winch / Ramp / Levers.  
➤ Scientific term: .....
- 4- Crowbar / Scissors / Tweezers / Pliers.  
➤ Scientific term: .....
- 5- Hand broom / Pliers / Lemon squeezer / Nutcracker.  
➤ Scientific term: .....
- 6- Coal tongs / Tweezers / Scissors / Broom.
- 7- Scientific term: .....

\*\*\*\*\*

8) Mention the difference between:

Lemon Squeezer and Scissors (in terms of: type of lever – Mechanical advantage – saving effort).

| P.O.C.               | Lemon Squeezer | Scissors |
|----------------------|----------------|----------|
| Type                 | .....          | .....    |
| Mechanical advantage | .....          | .....    |
| Saving effort        | .....          | .....    |



9) Give reason for:

1- Mass is a scalar physical quantity.

➤ .....

2- Acceleration is a vector physical quantity.

➤ .....

3- The bag placed on a table remains stationary unless someone moves it from its place.

➤ .....

4- Rushing the bus passenger forward when the bus stops suddenly.

➤ .....

5- Rushing the passenger of the stationary bus backward when it moves suddenly.

➤ .....

6- Water spilling from the cup when the cup moves suddenly.

➤ .....

7- A large truck loaded with goods is harder to park than a small car moving at the same speed.

➤ .....

8- The greater the net force acting on the object, the greater its acceleration at constant mass.

➤ .....

9- When a shell is fired forward from a cannon, the cannon moves backward.

(The boat moves backward when a person jumps from its front forward)

➤ .....

10- In the elastic collision, there is no loss of energy or velocity.

➤ .....

11- Scissors is a first class lever.

➤ .....

12- Nutcracker is a second class lever.

➤ .....

13- Coal tongs are third class lever.

➤ .....

14- The mechanical advantage of second class levers is always greater than 1.

➤ .....

15- Pliers and wheelbarrow save effort.

➤ .....

16- Broom and scissors don't save effort.

➤ .....

17- Seesaw doesn't save effort.

➤ .....

18- Using third class levers although they do not save effort.

➤ .....

19- Construction workers use a long crowbar to lift heavy rocks.

➤ .....

20- The effort arm can be equal to the load arm in the first type of levers only.

➤ .....

\*\*\*\*\*

### 10) What are the results of (What happens...)?

1- If two forces equal in magnitude and opposite in direction (**net force equal zero**) act on the same line of action on:

a) **Stationary object.**

➤ .....

b) **Moving object at constant velocity.**

➤ .....

2- If the net force acting on a stationary object does not equal zero.

➤ .....

3- A car is exerted by a force in the same direction as its movement (**to the speed of the car**).

➤ .....

4- Pulling the tablecloth from under a fruit plate quickly (**to the plate**).

➤ .....

5- Increasing the mass of a stationary object (**to its inertia and stopping time**).

➤ .....

6- Unbalanced forces act on a moving object.

➤ .....

7- Reducing the net force acting on the same object to half (**to acceleration**).

➤ .....

8- Increasing both the net force acting on the object and its mass to double (**to acceleration**).

➤ .....

9- Doubling the mass of an object with constant net force (**to acceleration**).

➤ .....

10- Air is released from an inflated balloon on the left (**for the balloon movement**).

➤ .....

11- Two objects with equal masses moving at the same velocity in opposite directions collide with each other.

➤ .....

12- An elastic collision occurs between two identical masses, one stationary and the other is moving.

➤ .....

13- The mechanical advantage of a simple machine is Greater than 1.

➤ .....

14- The fulcrum in the first class lever is moved farther from the load.

➤ .....

15- The effort arm is equal to the load arm in a lever.

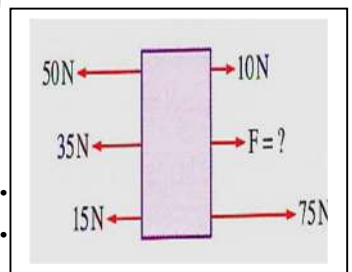
➤ .....

\*\*\*\*\*

### 11) Problems:

1- In the opposite figure, calculate the value of the force (F) that achieves balancing.

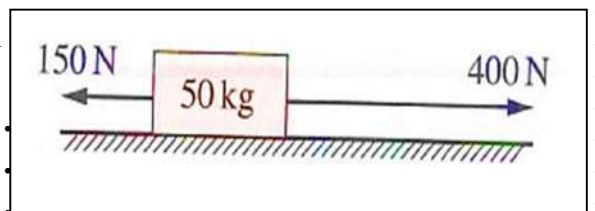
.....  
 .....  
 .....



\*\*\*\*\*

2- In the opposite figure, calculate the acceleration of the object.

.....  
 .....  
 .....



\*\*\*\*\*

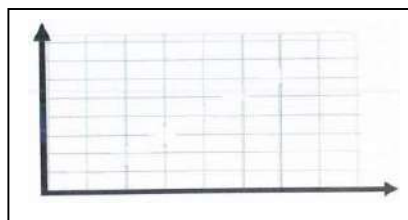
3- Calculate the required force to move a car of mass 500 kg with an acceleration of 2 N/kg.

.....

\*\*\*\*\*

4- Draw the following graph from the following table, then calculate the object's mass.

.....  
 .....  
 .....



| Force | Acceleration |
|-------|--------------|
| 2     | 1            |
| 4     | 2            |
| 6     | 3            |
| 8     | 4            |

5- A load whose weight is 60 N was placed at a distance of 1.5 m to the right of the fulcrum of a lever and another load of weight 180 N was placed on the other side of the lever at a distance of (Y) to achieve equilibrium. Calculate the value of (Y)?

.....  
.....  
.....

\*\*\*\*\*

6- A type of first class lever at equilibrium, had a force of 40 N and an effort arm of 5cm. It affected a load of 100 N.

a) Calculate the length of the load arm.

b) Does the lever save effort or not?

.....  
.....  
.....

\*\*\*\*\*

7- A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.

a) Is this lever balanced? and why?

b) If the lever is unbalanced, what is the length of the load arm that achieves balance?

.....  
.....  
.....

\*\*\*\*\*

12) State one importance for each of the following:

1- Cruise Control.

.....

2- Seat belt.

.....

3- Airbag.

.....

4- Ramp (The inclined plane).

.....

5- The wedge.

.....



6- Claw hammer.

.....

7- Forceps.

.....

\*\*\*\*\*

**13) Variant questions:**

1- **Explain:** The air hockey disc maintains its state of motion for a long time after being pushed on the table surface.

➤ .....  
.....

2- Car(A) has a mass of 4 kg and moves at a velocity of 1 m/s, while Car(B) has a mass of 2 kg and moves at a velocity of 6 m/s. Which of the two cars has the least inertia (With explanation).

➤ .....  
.....

3- **Mention:** The factors affecting acceleration.

.....  
.....

4- **Mention:** The safety precautions in cars.

.....  
.....

5- **Mention:** how levers make tasks easier.

➤ .....  
.....

6- **Explain:** The position of the fulcrum in a first class lever affects the effort required to lift a heavy load.

➤ .....  
.....

7- **Explain:** The Forearm in human body represents third class lever.

➤ .....  
.....

## G8 Final Revision on unit 2 (answered)

### 1) Choose the correct answer:

- 1- All the following include scalar physical quantities, except.....  
a) acceleration                      b) distance                      c) time                      d) mass
- 2- .....believed that objects do not continue in motion unless a force acted continuously on them..  
a) Galileo                      b) Mendeleev                      c) Aristotle                      d) Newton
- 3- The scientist ..... studied the velocity of sound in air.  
a) Galileo                      b) Mendeleev                      c) Aristotle                      d) Newton
- 4- If balanced forces act on a moving object, its velocity.....  
a) increases                      b) decreases                      c) remains constant                      d) becomes zero
- 5- If two forces of (6 N, 6N) act on a stationary object in the same direction, then the net force acting on the object equals.....  
a) zero                      b) 6 N                      c) 12 N                      d) 36 N
- 6- A person tried to push a box of mass 50 kg placed on a rough horizontal surface but he could not, this means that the net force acting on the box equals.....  
a) zero                      b) 25 N                      c) 50 N                      d) 100 N
- 7- When a stationary bus moves forward suddenly, its passengers are rushed.....  
a) to right                      b) to left                      c) forward                      d) backward
- 8- ..... is the distance travelled by the moving object during the stopping time.  
a) Acceleration                      b) Stopping distance                      c) Velocity                      d) Force
- 9- The air hockey game represents a technological application of.....  
a) Newton's first law                      b) Newton's second law  
c) Newton's third law                      d) law of gravitation
- 10- All the following are cases in which the object moves with acceleration, except when its.....  
a) velocity increases over time.                      b) velocity decreases over time.  
c) velocity is constant.                      d) direction of motion changes.
- 11- When the net force acting on the object increases to double and its mass decreases to half the acceleration of a moving object.....its value.  
a) increases to double.                      b) increases four times.  
c) decreases to half.                      d) decreases to quarter.
- 12- .....protects the driver from hitting the windshield of a moving car when the brakes are applied suddenly.  
a) Seat belt                      b) Inertia                      c) Speedometer                      d) Cruise control

- Tel: 01014731686**

## 2) Complete the following statements:

- 1- Mass is a scalar physical quantity, while acceleration is a vector physical quantity.
- 2- Force is a vector physical quantity that is fully defined by both magnitude and direction.
- 3- Force is measured in Newton units by a device called Newton meter (or spring balance).
- 4- The scientist who made important contributions in the field of optics is Newton.
- 5- If two forces acting on an object are equal in magnitude and opposite in direction along the same line of action, the net force is zero.
- 6- If the resultant force is not equal to zero, so the forces are unbalanced.
- 7- The passengers of the bus are rushed forward when it stops suddenly according to Newton's first law.
- 8- As the mass of the stationary object increases, its inertia increases.
- 9- The stopping distance is directly proportional to the mass of the object.
- 10- When the velocity of an object increases or decreases, the object acquires acceleration.
- 11- Acceleration is measured in the unit N/kg which is equivalent to m/s<sup>2</sup>.
- 12- As the mass of the object increases, its acceleration decreases at constant net force.
- 13- The acceleration with which an object moves is directly proportional to the net force acting on it.
- 14- It is recommended to wear a seat belt when driving a car.
- 15- The airbag works with the seat belt to decrease the rate of change in velocity when the brakes are applied.
- 16- Among the properties of the action force and reaction force is that they are equal in magnitude and opposite in direction.
- 17- Launching a rocket in a direction opposite to that of the expelled gases is explained by Newton's third law.
- 18- When a collision occurs between two identical masses with a loss of kinetic energy, the collision is known as inelastic, while if there is no loss of kinetic energy, the collision is known as elastic.
- 19- Elastic collision is the collision that keeps both body's kinetic energy and body's velocity.
- 20- A ball (X) of mass 1 kg moving at a velocity of 4 m/s collides elastically with a stationary ball (Y) having the same mass, so after the collision the velocity of ball (X) becomes zero while the velocity of ball (Y) becomes 4 m/s.
- 21- In inelastic collision, a loss of energy occurs in the form of heat or sound.



- 22- Gears and belts are used in bicycles to transfer motion and change speed.
- 23- The tower crane is a complex machine, while levers are simple machines.
- 24- Load arm is the distance between the applied force and the fulcrum.
- 25- The product of multiplying the load by its arm is called moment of load.
- 26- The mechanical advantage of a lever determines how much it saves effort.
- 27- The lever is at equilibrium when the moment of load equals the moment of effort.
- 28- The lever saves effort when its mechanical advantage is greater than one.
- 29- In second class levers the load is located between the fulcrum and the effort such as nutcracker.
- 30- All second class levers save effort.
- 31- The effort arm is equal to the load arm in the first class levers, such as seesaw.
- 32- The crowbar is a second class lever, while the manual broom is a third class lever.
- 33- Increasing the length of the effort arm leads to increasing the required effort, thus the mechanical advantage increases.
- 34- In the human body, the joints represent fulcrum, while contraction force of muscles represents the effort.
- 35- In the human body, the head represents a first class lever, while the forearm represents a third class lever.
- 36- At the lever equilibrium, when the effort arm is longer than the load arm, the load is greater than the effort.

\*\*\*\*\*

### 3) Write the scientific term:

- 1- The scientist who formulated the laws of motion and the universal law of gravitation. (Isaac Newton)
- 2- The property of the body resistance to changing its dynamic state. (Inertia)
- 3- The time taken for the moving object to stop. (Stopping time)
- 4- The rate of change of velocity. (Acceleration)
- 5- It allows the user to fly in the air upwards as the water rushes down through its openings. (Flyboard)
- 6- It works by pushing air from its motor downwards, which is followed by pushing it upwards with equal force. (Drones)
- 7- A means used by man to save time or effort or both while performing tasks. (Machines)
- 8- A simple machine that is used to change the direction of force during lifting or lowering weights. (Pulley)
- 9- It is a rigid rod, either straight or curved, that is pivoted on a fixed point. (Lever)
- 10- The distance between the load and the fulcrum. (Load arm)

- 11- A fixed point on which a rigid bar rests. (Fulcrum)  
 12- The product of multiplying the effort by its arm. (Moment of effort)  
 13- A lever whose fulcrum is located between the effort and the load. (First class lever)  
 14- Levers don't always save effort, but they are used in precise and dangerous tasks. (Third class levers)  
 \*\*\*\*\*

#### 4) What is meant by (define):

- 1- Net force (Resultant force).  
 ➤ It is the total force in magnitude and direction resulting from the effect of number of forces acting on an object.  
 2- Newton's first law (Law of Inertia).  
 ➤ The object keeps its state of rest or motion at a constant velocity in a straight line, unless acted upon by external unbalanced forces that change its state.  
 3- Inertia.  
 ➤ It is the tendency of an object to maintain its state of rest or motion.  
 4- Acceleration.  
 ➤ The change in the velocity of the object per unit time.  
 5- The net force acting on an object of mass 2 kg equals 10 N.  
 ➤ This means that the object moves with an acceleration of  $5 \text{ m/s}^2$  in the same direction as the net force ( $a = F \div m = 10 \div 2 = 5 \text{ m/s}^2$ ).  
 6- Newton's Third Law.  
 ➤ For every action, there is an equal and opposite reaction.  
 7- Simple machines.  
 ➤ Tools that may have some moving parts and are used to make tasks easier.  
 8- Law of levers.  
 ➤ The product of multiplying the effort by its arm equals the product of multiplying the load by its arm.  
 9- Mechanical advantage of lever.  
 ➤ It is the ratio between the effort arm length to the load arm length.  
 \*\*\*\*\*

#### 5) Put (✓) or (x):

- 1- The forces acting on an object are described as balanced when their resultant forces are zero. (✓)  
 2- A box placed on the top of a moving car will move backward when the car stops suddenly. (x)  
 3- The greater the inertia of a moving object, the shorter the stopping time and the stopping distance when using the brakes. (x)

- 4- The greater the inertia of a moving object, the harder for it to be stopped. (✓)
- 5- The greater the net force acting on the object, the less its acceleration at constant mass. (x)
- 6- The acceleration at which a car of mass 1000 kg moves when the engine force is 1300 N equals 2 m/s<sup>2</sup>. (x)
- 7- The flyboard is a life application of Newton's third law. (✓)
- 8- The action force and reaction force act without any time difference. (✓)
- 9- The forces of action and reaction act on the same body and therefore do not cancel each other out. (x)
- 10- The wedge is used to change the direction of the applied force. (✓)
- 11- The most common type of levers are first class levers. (✓)
- 12- Pliers represent third class lever and save effort. (x)
- 13- While Standing on the tiptoes, the foot represents a second class lever. (✓)
- 14- Third class levers always save effort. (x)
- 15- Scissors are first class lever and can save effort. (x)
- 16- The bones that make up the skeletal system are levers. (✓)

\*\*\*\*\*

#### 6) Correct the underlined words:

- 1- Aristotle explained that that objects tend to maintain their state of rest or motion unless acted upon by an external force. (Galileo)
- 2- The scientist Galileo discovers gravity. (Newton)
- 3- If two forces act in opposite direction along same line of action, the resultant is the sum of the two forces. (difference)
- 4- Newton's second law is known as Law of Inertia. (first)
- 5- Speedometer works to maintain the constant velocity of cars without direct driver intervention. (Cruise control)
- 6- The direction of acceleration is always in the opposite direction as the net force. (same)
- 7- The acceleration of a moving object is directly proportional to its mass at constant net force. (inversely)
- 8- The action force and reaction force always act on one object. (two different objects)
- 9- In drones, the downward push of air from the engines represents the reaction force. (action)
- 10- In elastic collision between two objects, the relative velocity of the two objects after the collision is greater than their relative velocity before collision. (equal to)

- 11- There are only two types of levers. (three)
- 12- Law of gravitation explains the relation between effort and load at equilibrium of lever. (Law of levers)
- 13- The levers are described as being at equilibrium when the moment of effort less than the moment of load. (equal to)
- 14- In second class levers, the effort arm equals the load arm. (greater than)
- 15- All second class levers change direction. (third)
- 16- Soda water opener is a first class lever. (second)
- 17- In first class lever the effort is located between the fulcrum and the load. (third)
- 18- The fishing rod is one of the second type of levers (third)
- 19- Scissors are third class levers that used to avoid the risk of burns. (Coal tongs)
- 20- If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to 25 cm. (100 cm)

\*\*\*\*\*

**7) Cross out the odd word and write the scientific term of others:**

- 1- Acceleration / Force / Velocity / Time.  
➤ Scientific term: **vector physical quantities**.
- 2- Load / Fulcrum / Flyboard / Effort.  
➤ Scientific term: **Elements of levers**.
- 3- Pulley / Winch / Ramp / Levers.  
➤ Scientific term: **Simple machines**.
- 4- Crowbar / Scissors / Tweezers / Pliers.  
➤ Scientific term: **First class levers**.
- 5- Hand broom / Pliers / Lemon squeezer / Nutcracker.  
➤ Scientific term: **Levers that save effort (mechanical advantage greater than 1)**.
- 6- Coal tongs / Tweezers / Scissors / Broom.
- 7- Scientific term: **Third class levers**.

\*\*\*\*\*

**8) Mention the difference between:**

**Lemon Squeezer and Scissors (in terms of: type of lever – Mechanical advantage – saving effort).**

| P.O.C.               | Lemon Squeezer       | Scissors           |
|----------------------|----------------------|--------------------|
| Type                 | Second class levers. | First class levers |
| Mechanical advantage | Greater than 1.      | Less than 1.       |
| Saving effort        | Save effort.         | Don't save effort. |



**9) Give reason for:**

**1- Mass is a scalar physical quantity.**

- Because mass is fully defined by magnitude only.

**2- Acceleration is a vector physical quantity.**

- Because acceleration is fully defined by both magnitude and direction.

**3- The bag placed on a table remains stationary unless someone moves it from its place.**

- Because according to Newton's first law, stationary object keeps its state of rest unless acted upon by external unbalanced forces that change its state.

**4- Rushing the bus passenger forward when the bus stops suddenly.**

- Due to inertia of passenger that causes him to resist the sudden stop to keep his state of motion.

**5- Rushing the passenger of the stationary bus backward when it moves suddenly.**

- Due to inertia of passenger that causes him to resist the sudden movement to keep his state of rest.

**6- Water spilling from the cup when the cup moves suddenly.**

- Due to inertia of water that causes it to resist the sudden movement to keep its state of rest.

**7- A large truck loaded with goods is harder to park than a small car moving at the same speed.**

- Because as the mass of the object increases, its inertia increases that makes it harder to stop.

**8- The greater the net force acting on the object, the greater its acceleration at constant mass.**

- Because the acceleration of the object is directly proportional to the net force acting on the object.

**9- When a shell is fired forward from a cannon, the cannon moves backward.**

**(The boat moves backward when a person jumps from its front forward)**

- Because according to Newton's third law, for every action, there is an equal and opposite reaction without any time difference.

**10- In the elastic collision, there is no loss of energy or velocity.**

- Because the energy is transferred from the moving object to the stationary object completely, so the velocity of the stationary object after collision equals the velocity of the moving object before collision.

**11- Scissors is a first class lever.**

- Because the fulcrum is located between the effort and the load.

**12- Nutcracker is a second class lever.**

- Because the load is located between the fulcrum and the effort.

**13- Coal tongs are third class lever.**

- Because the effort is located between the fulcrum and the load.

**14- The mechanical advantage of second class levers is always greater than 1.**

- Because the effort arm is always longer than the load arm.

**15- Pliers and wheelbarrow save effort.**

- Because the effort arm is longer than the load arm, so their mechanical advantage is greater than 1.

**16- Broom and scissors don't save effort.**

- Because the effort arm is less than the load arm, so their mechanical advantage is less than 1.

**17- Seesaw doesn't save effort.**

- Because the effort arm equals the load arm, so its mechanical advantage equals 1.

**18- Using third class levers although they do not save effort.**

- Because they are used in precise and dangerous tasks.

**19- Construction workers use a long crowbar to lift heavy rocks.**

- Because as the length of the effort arm increases, the needed effort decreases and the mechanical advantage of this lever increases, thus saving more effort.

**20- The effort arm can be equal to the load arm in the first type of levers only.**

- Because the fulcrum is located between the effort and the load in the first class levers only, so when the fulcrum centered (in the middle of the rigid bar) the effort arm and the load arm become equal.

\*\*\*\*\*

**10) What are the results of (What happens...)?**

**1- If two forces equal in magnitude and opposite in direction (net force equal zero) act on the same line of action on**

**a) Stationary object.**

- The object remains stationary.

**b) Moving object at constant velocity.**

- The object continues moving at the same constant velocity.

**2- If the net force acting on a stationary object does not equal zero.**

- The object moves in the same direction of net force.

**3- A car is exerted by a force in the same direction as its movement (to the speed of the car).**

- The speed of the car increases.

- 4- Pulling the tablecloth from under a fruit plate quickly (to the plate).
  - The plate remains in its place.
- 5- Increasing the mass of a stationary object (to its inertia and stopping time).
  - Its inertia and stopping time increase.
- 6- Unbalanced forces act on a moving object.
  - The object gains acceleration in the same direction as the net force.
- 7- Reducing the net force acting on the same object to half (to acceleration).
  - The acceleration has decreased to half.
- 8- Increasing both the net force acting on the object and its mass to double (to acceleration).
  - The acceleration remains the same (doesn't change).
- 9- Doubling the mass of an object with constant net force (to acceleration).
  - The acceleration has decreased to half.
- 10- Air is released from an inflated balloon on the left (for the balloon movement).
  - The balloon moves to right without any time difference.
- 11- Two objects with equal masses moving at the same velocity in opposite directions collide with each other.
  - Both will move in the opposite direction with the same velocity.
- 12- An elastic collision occurs between two identical masses, one stationary and the other is moving.
  - The stationary mass moves while the moving mass stops.
- 13- The mechanical advantage of a simple machine is Greater than 1.
  - This machine saves effort.
- 14- The fulcrum in the first class lever is moved farther from the load.
  - The load arm length increases and thus the mechanical advantage decreases.
- 15- The effort arm is equal to the load arm in a lever.
  - Its mechanical advantage equals 1 and thus it doesn't save effort.

\*\*\*\*\*

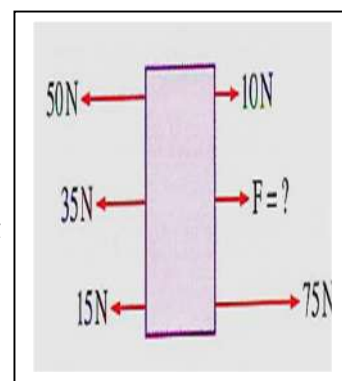
### 11) Problems:

- 1- In the opposite figure, calculate the value of the force (F) that achieves balancing.

Total forces acting to the left = Total forces acting to the right

$$50 + 35 + 15 = 10 + 75 + F$$

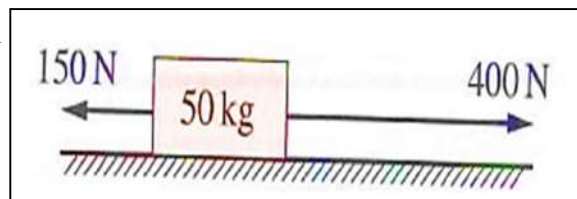
$$F = 100 - 85 = 15 \text{ N}$$



- 2- In the opposite figure, calculate the acceleration of the object.

The net force =  $400 - 150 = 250 \text{ N}$ .

Acceleration =  $F \div m = 250 \div 50 = 5 \text{ m/s}^2$



\*\*\*\*\*

- 3- Calculate the required force to move a car of mass 500 kg with an acceleration of 2 N/kg.

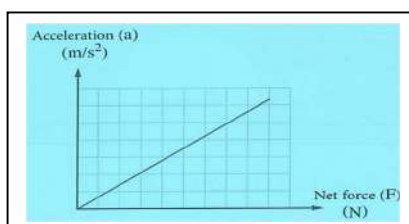
$$F = a \times m = 2 \times 500 = 1000 \text{ N}.$$

\*\*\*\*\*

- 4- Draw the following graph from the following table, then calculate the object's mass.

The object's mass =  $6 \div 3 = 2 \text{ kg}$ .

Or =  $8 \div 4 = 2 \text{ kg}$ .



| Force | Acceleration |
|-------|--------------|
| 2     | 1            |
| 4     | 2            |
| 6     | 3            |
| 8     | 4            |

\*\*\*\*\*

- 5- A load whose weight is 60 N was placed at a distance of 1.5 m to the right of the fulcrum of a lever and another load of weight 180 N was placed on the other side of the lever at a distance of (Y) to achieve equilibrium. Calculate the value of (Y)?

$$\text{Effort} \times \text{Effort Arm} = \text{Load} \times \text{Load Arm}$$

$$60 \times 1.5 = 180 \times Y$$

$$Y = 90 \div 180 = 0.5 \text{ m}.$$

\*\*\*\*\*

- 6- A type of first class lever at equilibrium, had a force of 40 N and an effort arm of 5cm. It affected a load of 100 N.

a) Calculate the length of the load arm.

b) Does the lever save effort or not?

$$\text{Effort} \times \text{Effort Arm} = \text{Load} \times \text{Load Arm}$$

$$40 \times 5 = 100 \times \text{Load Arm}$$

$$\text{Load Arm} = 200 \div 100 = 2 \text{ cm}.$$

$$\text{Mechanical advantage of the lever} = \frac{\text{Load}}{\text{Effort}} = \frac{100}{40} = 2.5 \text{ (saves effort)}$$



7- A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.

a) Is this lever balanced? and why?

b) If the lever is unbalanced, what is the length of the load arm that achieves balance?

Moment of Effort = Effort  $\times$  Effort Arm = 30  $\times$  20 = 600

Moment of load = Load  $\times$  Load Arm = 20  $\times$  10 = 200

The lever is unbalanced because Moment of Effort and Moment of load are not equal, thus it doesn't fulfill the law of levers.

To achieves balance:

Effort  $\times$  Effort Arm = Load  $\times$  Load Arm

30  $\times$  20 = 20  $\times$  Load Arm

Load Arm = 600  $\div$  20 = 30 cm.

\*\*\*\*\*

12) State one importance for each of the following:

1- **Cruise Control:** used to keep the car moving at a constant velocity on highways, without direct intervention from the driver.

2- **Seat belt:** it protects the driver from being rushed forward toward the steering wheel during sudden stop.

3- **Airbag:** it works with the seat belt to prolong the time of collision by reducing the rate of change of velocity, thus minimizes the impact of collision on the driver.

4- **Ramp (The inclined plane):** It is used to save effort.

5- **The wedge:** It is used to change the direction of the applied force.

6- **Claw hammer:** used to multiply the force during removing a nail fixed in a wooden board.

7- **Forceps:** used in precise tasks.

\*\*\*\*\*

13) Variant questions:

1- **Explain:** The air hockey disc maintains its state of motion for a long time after being pushed on the table surface.

- Blowing continuous stream of air is through many small holes on the table surface, reducing friction between the disc and the table, allowing the disc to keep its state of motion for a longer period.

2- Car(A) has a mass of 4 kg and moves at a velocity of 1 m/s, while Car(B) has a mass of 2 kg and moves at a velocity of 6 m/s. Which of the two cars has the least inertia (With explanation).

➤ Car(B) has the least inertia, because it has the smaller mass.

3- **Mention:** The factors affecting acceleration.

1) The mass of the object.

2) The net force acting on the object.

4- **Mention:** The safety precautions in cars.

1) The seat belt.

2) The airbag.

5- **Mention:** how levers make tasks easier.

➤ Levers make tasks easier by multiplying the force, increasing the speed and performing precise and dangerous tasks.

6- **Explain:** The position of the fulcrum in a first class lever affects the effort required to lift a heavy load.

➤ The closer the fulcrum is to the load, the longer is the effort in the lever and thus the mechanical advantage of the lever increases and saving more effort.

7- **Explain:** The Forearm in human body represents third class lever.

➤ Because the elbow joint represents the fulcrum and the pull of biceps muscle represents the effort, while the object held in the palm of the hand is the load.

## G8 Final Revision on unit 3

### 1) Choose the correct answer:

- 1- All the following contain half the genetic material (n), except.....  
a) pollen grain      b) sperm      c) ovum      d) intestinal cell
- 2- All the following are somatic cells, except.....  
a) muscle cells      b) sperm      c) collenchyma cells      d) parenchyma cells
- 3- ..... cells responsible for the formation of male gametes in plants.  
a) testis      b) ovary      c) anther      d) parenchymal
- 4- The number of chromosomes in cardiac muscle cells in human is symbolized by the symbol.....  
a) n      b) 2n      c)  $n^2$       d) 4n
- 5- A human somatic cell contains..... chromosomes.  
a) 23      b) 46      c) 48      d) 56
- 6- The number of chromosomes present in each of a somatic cell and a sperm of a living organism, respectively is..... chromosomes.  
a) 6, 12      b) 12, 6      c) 8, 8      d) 5, 6
- 7- When a cell contains 24 chromosomes divides mitotically, it produces two cells each contain..... pairs of chromosomes.  
a) 6      b) 12      c) 24      d) 48
- 8- A skin cell of an animal contains 8 chromosomes; thus the number of chromosomes present in each sperm produced by this animal equals.....  
a) 4      b) 8      c) 16      d) 32
- 9- All the following are from the important functions of mitosis, except.....  
a) repairing bone fractures.      b) growth of the living organism.  
c) formation of gametes.      d) wound healing.
- 10- The division of a testis cell in a human male produces.....  
a) 2 sperms      b) 4 sperms      c) 2 pollen grains      d) 4 pollen grains
- 11- If one of the cells in your body is divided twice and produces 4 cells, so the type of cell is..... and the type of division is.....  
a) somatic / meiosis      b) reproductive / meiosis  
c) somatic / mitosis      d) reproductive / mitosis
- 12- The flower arises from an axillary bud of a leaf called.....  
a) sepal.      b) petal.      c) bract.      d) inflorescence.
- 13- The part of the stem that carries a cluster of flowers called.....  
a) peduncle.      b) pedicel.      c) bract.      d) inflorescence.

- 14- The inflorescence of .....plant is characterized by flowers which emerge on both sides of the peduncle.  
a) snapdragon                      b) garlic                      c) onion                      d) cherry
- 15- .....protects the inner parts of the flower, especially before blooming.  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 16- The floral whorl whose function is attracting insects by its colour and scent is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 17- The floral whorl which is located at the center of the typical flower is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 18- The floral whorl that is absent in the female flower is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 19- .....flower is an example of naked flowers.  
a) Egyptian rose                      b) Willow                      c) Daffodil                      d) Petunia
- 20- All the following are unisexual flowers, except.....  
a) Zucchini                      b) Date palm                      c) Tomato                      d) Maize
- 21- It is difficult to distinguish the colour of sepals from petals in ..... flower.  
a) Egyptian rose                      b) Willow                      c) Daffodil                      d) Petunia
- 22- The flower that contains only sepals, petals and stamens is.....flower.  
a) male                      b) female                      c) bisexual                      d) typical
- 23- .....flowers are used to relieve muscle pain.  
a) Egyptian rose                      b) Willow                      c) Chamomile                      d) Lavender
- 24- Calyx may remain after fruit formation as in.....  
a) cucumber                      b) zucchini                      c) tomato                      d) Petunia
- 25- All the following are characteristics of pollen grains in wind-pollinated flowers, except that they are .....  
a) rough.                      b) light.                      c) dry.                      d) smooth.
- 26- Pollination often occurs in large and colourful flowers by .....  
a) air.                      b) insects.                      c) water.                      d) human.
- 27- The fertilized ovule is called the.....  
a) seed.                      b) zygote.                      c) fruit.                      d) embryo.



**2) Complete the following statements:**

- 1- Cells in living organisms are classified into two types which are ..... and .....
- 2- The .....cells and .....cells are somatic cells in the stem and leaves of plants.
- 3- In human, the number of chromosomes in the sperm is .....the number of chromosomes in the ovum.
- 4- The ratio of the number of chromosomes in somatic cell to its number in gamete cell is .....
- 5- Both chimpanzee and a potato plant have .....chromosomes, while elephant has .....chromosomes.
- 6- Cell divisions are classified into two types which are .....and .....
- 7- Somatic cells divide by ....., while gonads divide by .....
- 8- The crossing-over phenomenon occurs during .....division.
- 9- The purpose of meiosis is to form .....
- 10- .....reproduction depends on a single parental individual.
- 11- .....reproduction is characterized by the production of individuals having traits shared from both parents.
- 12- Sexual reproduction depends on .....division, while asexual reproduction depends on .....division.
- 13- The .....phenomenon leads to the diversity of genetic traits among the individuals of the same species.
- 14- In sexual reproduction of the frog, zygote grows into the .....stage, which transforms into an adult frog.
- 15- .....reproduction keeps the genetic traits of living organisms.
- 16- Simple .....inflorescences resemble a cluster of grapes, while simple .....inflorescences resemble tent.
- 17- The type of inflorescences in Iberis plant is ....., while the type of inflorescences in garlic plant is .....
- 18- The calyx composed of leaves called ....., while corolla composed of leaves called .....
- 19- The male organ of the flower consists of several leaves called ....., while pistil consists of one or more leaves called .....
- 20- In the typical flower, the floral whorl that lies just inside the corolla is .....
- 21- The female organ in the flower is ....., while the male organ is .....
- 22- In Daffodil flower, the calyx and corolla are collectively called the .....

- 23- The .....flower is symbolized by (♀), while the ..... flower is symbolized by (♂).
- 24- According to sex of the flower, the flower of the pumpkin plant is ....., while the flower of the eggplant is .....
- 25- Flower pollination is divided into two types which are self-pollination and .....-pollination.
- 26- Flowering plants depend on several methods to transfer pollen grains, including ....., ....., .....and humans.
- 27- When a ..... falls on the stigma of a flower, the stigma secretes a .....solution.
- 28- The pollen tube reaches the ovule through the .....opening.
- 29- After fertilization, the ovary develops into a ....., while the ovules inside the ovary develop into .....
- 30- After fruit formation, corolla may remain attached as in ....., while both .....and .....may persist as in pomegranate.
- 31- The life cycle of flowering plants passes through four stages which are ....., vegetative growth, .....and seed dispersal.
- \*\*\*\*\*

### 3) Write the scientific term:

- 1- The basic unit of structure and function in living organisms.
- 2- A vital biological process through which a living organism produces new individuals of the same species.
- 3- Specialized cells responsible for sexual reproduction in living organisms.
- 4- They include all the cells of the living organism, except the reproductive cells.
- 5- They are organs responsible for production of reproductive cells.
- 6- Abnormal cell growth formed when a somatic cell undergoes uncontrolled mitotic division repeatedly and abnormally.
- 7- The re-arrangement of genetic material between homologous chromosomes during the first meiotic division.
- 8- The form of asexual reproduction that occurs in the potato plant through its tubers.
- 9- Type of reproduction that involves two parental individuals.
- 10- The cell resulting from the process of fertilization.
- 11- A short stem whose leaves are modified to perform the reproductive function.

- 12- A cluster of flowers carried by the peduncle.
- 13- An inflorescence in which all the pedicels emerge from one point at the end of the peduncle.
- 14- An inflammation caused by an immune response to harmless substances such as pollen grains.
- 15- The male reproductive organ in the flower, consisting of several stamens.
- 16- An opening through which the nucleus of the pollen grain reaches the nucleus of the ovule.
- 17- Stage in which the seed develops into a seedling that begins to emerge from the soil.

\*\*\*\*\*

**4) What is meant by:**

1- Gonads.

➤ .....

2- Fertilization.

➤ .....

3- Naked flowers (mention an example).

➤ .....

4- Typical flower (mention an example).

➤ .....

5- Pollination.

➤ .....

\*\*\*\*\*

**5) Put (√) or (x):**

- 1- Sperms and pollen grains are female gametes. ( )
- 2- The number of chromosomes in the human somatic cell is equal to half their number in gametes. ( )
- 3- Gametes contain a diploid number of chromosomes. ( )
- 4- There is no relation between the size of the living organism and its chromosome count. ( )
- 5- The number of chromosomes in the cells of chimpanzee is equal to that in the cells of potato plant. ( )
- 6- Somatic cell in crow contains 40 pair chromosomes. ( )
- 7- Division of one cell mitotically produces two cells; each contains half the genetic material present in the parent cell. ( )
- 8- Cancerous tumors result from repeated abnormal meiotic divisions. ( )
- 9- The crossing-over phenomenon occurs during the second meiotic division. ( )

- 10- Potato tubers that reproduce asexually must contain buds. ( )
- 11- Asexual reproduction produces individuals carrying an exact genetic copy of the parental individual. ( )
- 12- Vegetative reproduction is one of the forms of sexual reproduction. ( )
- 13- Zygote grows by several meiotic divisions into an embryo. ( )
- 14- The female frog is larger in size than the male frog. ( )
- 15- Flowering plants are one of the most widespread plants in the world. ( )
- 16- The flower is a modified leaf. ( )
- 17- In simple corymb inflorescences, the flowers bloom from the center to the outside. ( )
- 18- The number of petals usually equals the number of sepals and alternates with them in position. ( )
- 19- The number of floral whorls in the typical flower is 3. ( )
- 20- Flowers contain antioxidants and volatile oils. ( )
- 21- In self-pollinated flowers, the anthers are at a lower level than the stigmas. ( )
- 22- The unisexual flower is cross-pollinated. ( )
- 23- Wind-pollinated flowers are characterized by long anthers and hanging outside stigmas. ( )
- 24- In the germination stage, the seed develops into a seedling. ( )

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#### 6) Correct the underlined words:

- 1- Gamete cells contain the full number of chromosomes found in somatic cells.
- 2- In a human female, the number of chromosomes in a liver cell half the number of chromosomes in one of her ovary cells.
- 3- The number of chromosomes in the cells of elephant is equal to that in the cells of crow.
- 4- The number of daughter cells resulting from several successive mitotic divisions can be calculated from the relation 2n.
- 5- If a pollen grain of a plant contains 10 chromosomes, so the collenchyma cell in the stem of this plant contains 20 pairs of chromosomes.
- 6- The somatic cells of the living organism contain haploid number of chromosomes.
- 7- The first meiotic division is similar to mitotic division.
- 8- The ratio of the number of chromosomes in sperm cell to its number in ovum cell is 2:1.
- 9- Mitosis is called reductional division.
- 10- After the second meiotic division, two cells are produced containing half the original number of chromosomes.



- 11- Pedicel is a swollen part at the end of the flower pedicel that carries the floral whorls.
- 12- The stamen consists of stigma, style and ovary.
- 13- Hibiscus flowers are used in the production of rose water and rose oil.
- 14- The female flower is symbolized by (♀).
- 15- Cross-pollinated flowers are characterized by the simultaneous maturity of the stamens and the pistil.
- 16- Petals of the wind-pollinated flowers have a scent.
- 17- The ovary that contains more than one pollen grain produces a fruit containing more than one seed.
- 18- During the germination stage in flowering plants, plant begins to form its roots, stem and leaves.

\*\*\*\*\*

**7) Cross out the odd word and write the scientific term of others:**

- 1- Pollen grain / Sperm / Ovum / Muscle cell.  
➤ Scientific term: .....
- 2- Gonad cells / Gametes cells / Intestinal cells / Cardiac muscle cells.  
➤ Scientific term: .....
- 3- Calyx / Corolla / Stem / Stamen/ Pistil.  
➤ Scientific term: .....
- 4- Sepals / Petals / Tubers / Carpels.  
➤ Scientific term: .....
- 5- Maize / Palm / Pumpkin / Rose.  
➤ Scientific term: .....
- 6- Stigma / Stamen / Style / Ovary.  
➤ Scientific term: .....
- 7- Stigma / Filament / Anther / Pollen grains.  
➤ Scientific term: .....

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**8) Mention the difference between (compare):**

- 1- Collenchyma cells and pollen grains in the plant.
- 2- Somatic cells and gonad cells (In terms of: Type of division - Number of daughter cells - Example in plant and animal).
- 3- Mitosis and meiosis in terms of Purpose of the division.

- 4- Sexual reproduction and asexual reproduction (In terms of: Number of individuals involved in reproduction – The type of division it depends on – The genetic traits of the resulting offspring).
- 5- Stamen and carpel (In terms of: Structure – Function).
- 6- Egyptian rose flower and Petunia flower.
- 7- Self-pollination and cross-pollination.
- 8- Pollen grains carried by wind and pollen grains carried by insects.

\*\*\*\*\*

9) **Give reason for:**

- 1- The somatic cell is symbolized by the symbol (2n), while gamete cell is symbolized by the symbol (n).  
➤ .....
- 2- The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity.  
(The potato plant and the chimpanzee are not genetically similar although they have the same chromosome count.)  
➤ .....
- 3- Mitosis is called equational division.  
➤ .....
- 4- Mitosis is important for the child's body.  
➤ .....
- 5- Meiosis is called reductional division.  
➤ .....
- 6- Reduction of the chromosome count to half during meiosis.  
➤ .....
- 7- Meiosis produces genetically different cells.  
➤ .....
- 8- Vegetative reproduction in the potato plant is a form of asexual reproduction.  
➤ .....
- 9- Asexual reproduction maintains the genetic structure of the living organism.  
➤ .....
- 10- New strains of grapes cannot appear if they are reproduced by vegetative reproduction.  
➤ .....
- 11- Vegetative reproduction is preferred in plants with good genetic traits.  
➤ .....

12- Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals.

(Individuals produced by sexual reproduction differ genetically from their parents.)

➤ .....

13- The inflorescences of the Iberis plant are called simple corymb inflorescences.

➤ .....

14- The calyx and corolla whorls in the Daffodil plant are called the perianth.

➤ .....

15- The importance of the floral envelope in flowers such as the Narcissus flower.

➤ .....

16- The tomato flower is a typical flower.

➤ .....

17- The typical flower is described as bisexual flower.

➤ .....

18- The flower of zucchini plant is unisexual flower.

➤ .....

19- The petals of rose plant have an economic importance for human.

➤ .....

20- The anthers of some flowers are long and hang outside the flower.

➤ .....

21- Pollen grains of wind-pollinated plants are light and smooth.

➤ .....

22- Wind-pollinated plants produce pollen grains in large numbers.

➤ .....

23- Stigmas of some flowers are feathery and sticky.

➤ .....

24- Some flowers have coloured petals and scent.

➤ .....

25- The anthers of some flowers are located inside the flower.

➤ .....

26- Pollen grains of some plants may be sticky or rough.

➤ .....

27- Stigmas of some flowers are sticky and are located inside the flower.

➤ .....

28- The peach fruit contains one seed, while the pea fruit contains many seeds.

➤ .....

**10) What are the results of (What happens...)?**

- 1- The division of a liver cell (or somatic cell) in human by mitosis.  
➤ .....
- 2- The division of an intestinal cell in human through three successive mitotic divisions.  
➤ .....
- 3- The division of a gonad cell of a human male by meiosis.  
➤ .....
- 4- Somatic cells in human don't divide mitotically.  
➤ .....
- 5- The gonad cells in human do not divide meiotically.  
➤ .....
- 6- The occurrence of the crossing-over phenomenon during meiosis.  
➤ .....
- 7- The crossing-over phenomenon does not occur.  
➤ .....
- 8- The abnormal repeated mitotic divisions of a somatic cell.  
➤ .....
- 9- The fusion of the nucleus of a male human gamete with the nucleus of a female gamete.  
➤ .....
- 10- Stamens and carpels mature at the same time in some flowers.  
(Some flowers remain closed and do not bloom until pollination is completed.)  
➤ .....
- 11- Stamens and carpels do not mature at the same time in some flowers.  
(Anthers are far from the stigmas in some flowers.)  
➤ .....
- 12- The gynoecium is removed from a typical flower before it blooms.  
➤ .....
- 13- Falling of a pollen grain on the stigma of a flower of the same type.  
➤ .....
- 14- Falling of a plant seed into suitable soil.  
➤ .....



**11) State one importance for each of the following:**

1- Gametes.

.....

2- Meiosis in human.

.....

3- Fertilization.

.....

4- The flower.

.....

5- The corolla.

.....

6- Chamomile flowers.

.....

7- Hibiscus flowers.

.....

\*\*\*\*\*

**12) Variant questions:**

1- If the number of chromosomes in a stomach cell of an organism is 26 chromosomes. What are the count chromosomes in one of its reproductive cells?

➤ .....

2- If the number of chromosomes in the ovum of a female animal is 16 chromosomes. What is the number of chromosomes in the following cells of this animal:

1) Liver cell.

2) Sperm of the male.

➤ .....

3- Calculate the number of cells resulting from the division of a skin cell through 5 successive mitotic divisions.

➤ .....

4- The opposite figure represents a vital phenomenon:

a) What is the name of this phenomenon?

➤ .....

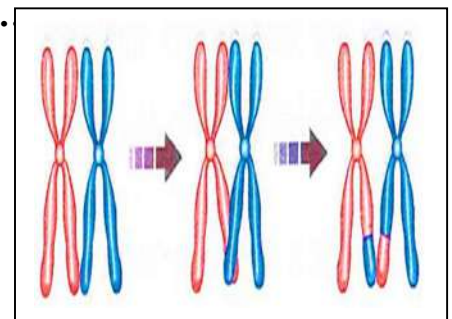
b) In which type of division does this phenomenon occur?

➤ .....

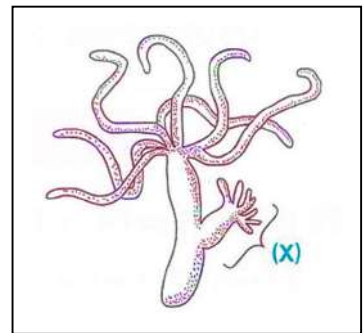
c) What is the importance of this phenomenon?

➤ .....

.....



5- The opposite figure shows the reproduction of a living organism produced by a single parent:



a) What is the type of this reproduction?

➤ .....

b) Does this reproduction occur through meiosis or mitosis?

➤ .....

c) What are the genetic traits of the cells in part (X) resulting from the reproduction?

➤ .....

6- Study the opposite figure, then answer:

a) Write what the numbers indicate.

(1) .....

(2) .....

(3) .....

(4) .....

(5) .....

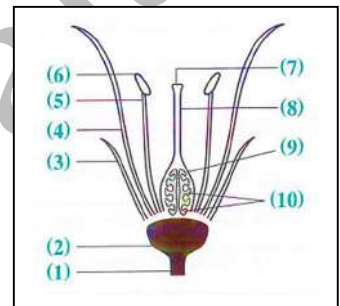
(6) .....

(7) .....

(8) .....

(9) .....

(10) .....



b) Complete:

1. Part (3) participates in the formation of a floral whorl called ....., while part (4) participates in the formation of a floral whorl called .....
2. According to sex of the flower, the flower in the opposite diagram is .....
3. The male organ consists of parts number .....and .....
4. The female organ consists of parts number ....., .....and .....

## G8 Final Revision on unit 3 (answered)

### 1) Choose the correct answer:

- 1- All the following contain half the genetic material (n), except.....  
 a) pollen grain      b) sperm      c) ovum      d) intestinal cell
- 2- All the following are somatic cells, except.....  
 a) muscle cells      b) sperm      c) collenchyma cells      d) parenchyma cells
- 3- ..... cells responsible for the formation of male gametes in plants.  
 a) testis      b) ovary      c) anther      d) parenchymal
- 4- The number of chromosomes in cardiac muscle cells in human is symbolized by the symbol.....  
 a) n      b) 2n      c)  $n^2$       d) 4n
- 5- A human somatic cell contains..... chromosomes.  
 a) 23      b) 46      c) 48      d) 56
- 6- The number of chromosomes present in each of a somatic cell and a sperm of a living organism, respectively is..... chromosomes.  
 a) 6, 12      b) 12, 6      c) 8, 8      d) 5, 6
- 7- When a cell contains 24 chromosomes divides mitotically, it produces two cells each contain..... pairs of chromosomes.  
 a) 6      b) 12      c) 24      d) 48
- 8- A skin cell of an animal contains 8 chromosomes; thus the number of chromosomes present in each sperm produced by this animal equals.....  
 a) 4      b) 8      c) 16      d) 32
- 9- All the following are from the important functions of mitosis, except.....  
 a) repairing bone fractures.      b) growth of the living organism.  
 c) formation of gametes.      d) wound healing.
- 10- The division of a testis cell in a human male produces.....  
 a) 2 sperms      b) 4 sperms      c) 2 pollen grains      d) 4 pollen grains
- 11- If one of the cells in your body is divided twice and produces 4 cells, so the type of cell is..... and the type of division is.....  
 a) somatic / meiosis      b) reproductive / meiosis  
 c) somatic / mitosis      d) reproductive / mitosis
- 12- The flower arises from an axillary bud of a leaf called.....  
 a) sepal.      b) petal.      c) bract.      d) inflorescence.
- 13- The part of the stem that carries a cluster of flowers called.....  
 a) peduncle.      b) pedicel.      c) bract.      d) inflorescence.

- 14- The inflorescence of .....plant is characterized by flowers which emerge on both sides of the peduncle.  
a) snapdragon                      b) garlic                      c) onion                      d) cherry
- 15- .....protects the inner parts of the flower, especially before blooming.  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 16- The floral whorl whose function is attracting insects by its colour and scent is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 17- The floral whorl which is located at the center of the typical flower is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 18- The floral whorl that is absent in the female flower is.....  
a) Calyx                      b) Corolla                      c) Stamens                      d) Pistil
- 19- .....flower is an example of naked flowers.  
a) Egyptian rose                      b) Willow                      c) Daffodil                      d) Petunia
- 20- All the following are unisexual flowers, except.....  
a) Zucchini                      b) Date palm                      c) Tomato                      d) Maize
- 21- It is difficult to distinguish the colour of sepals from petals in ..... flower.  
a) Egyptian rose                      b) Willow                      c) Daffodil                      d) Petunia
- 22- The flower that contains only sepals, petals and stamens is.....flower.  
a) male                      b) female                      c) bisexual                      d) typical
- 23- .....flowers are used to relieve muscle pain.  
a) Egyptian rose                      b) Willow                      c) Chamomile                      d) Lavender
- 24- Calyx may remain after fruit formation as in.....  
a) cucumber                      b) zucchini                      c) tomato                      d) Petunia
- 25- All the following are characteristics of pollen grains in wind-pollinated flowers, except that they are .....  
a) rough.                      b) light.                      c) dry.                      d) smooth.
- 26- Pollination often occurs in large and colourful flowers by .....  
a) air.                      b) insects.                      c) water.                      d) human.
- 27- The fertilized ovule is called the.....  
a) seed.                      b) zygote.                      c) fruit.                      d) embryo.



**2) Complete the following statements:**

- 1- Cells in living organisms are classified into two types which are somatic cells and reproductive cells.
- 2- The parenchyma cells and collenchyma cells are somatic cells in the stem and leaves of plants.
- 3- In human, the number of chromosomes in the sperm is equal to the number of chromosomes in the ovum.
- 4- The ratio of the number of chromosomes in somatic cell to its number in gamete cell is 2:1.
- 5- Both chimpanzee and a potato plant have 48 chromosomes, while elephant has 56 chromosomes.
- 6- Cell divisions are classified into two types which are mitotic division and meiotic division.
- 7- Somatic cells divide by mitotic division, while gonads divide by meiotic division.
- 8- The crossing-over phenomenon occurs during meiotic division.
- 9- The purpose of meiosis is to form gametes.
- 10- Asexual reproduction depends on a single parental individual.
- 11- Sexual reproduction is characterized by the production of individuals having traits shared from both parents.
- 12- Sexual reproduction depends on meiotic division, while asexual reproduction depends on mitotic division.
- 13- The crossing-over phenomenon leads to the diversity of genetic traits among the individuals of the same species.
- 14- In sexual reproduction of the frog, zygote grows into the tadpole stage, which transforms into an adult frog.
- 15- Asexual reproduction keeps the genetic traits of living organisms.
- 16- Simple raceme inflorescences resemble a cluster of grapes, while simple umbel inflorescences resemble tent.
- 17- The type of inflorescences in Iberis plant is simple corymb, while the type of inflorescences in garlic plant is simple umbel.
- 18- The calyx composed of leaves called sepals, while corolla composed of leaves called petals.
- 19- The male organ of the flower consists of several leaves called stamens, while pistil consists of one or more leaves called carpels.
- 20- In the typical flower, the floral whorl that lies just inside the corolla is stamens.
- 21- The female organ in the flower is pistil, while the male organ is stamens.
- 22- In Daffodil flower, the calyx and corolla are collectively called the perianth.

- 23- The female flower is symbolized by (♀), while the male flower is symbolized by (♂).
- 24- According to sex of the flower, the flower of the pumpkin plant is unisexual, while the flower of the eggplant is bisexual.
- 25- Flower pollination is divided into two types which are self-pollination and cross-pollination.
- 26- Flowering plants depend on several methods to transfer pollen grains, including wind, insects, water and humans.
- 27- When a pollen grain falls on the stigma of a flower, the stigma secretes a sugary solution.
- 28- The pollen tube reaches the ovule through the micropyle opening.
- 29- After fertilization, the ovary develops into a fruit, while the ovules inside the ovary develop into seeds.
- 30- After fruit formation, corolla may remain attached as in cucumber, while both stamens and sepals may persist as in pomegranate.
- 31- The life cycle of flowering plants passes through four stages which are germination, vegetative growth, reproduction and seed dispersal.

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### 3) Write the scientific term:

- 1- The basic unit of structure and function in living organisms. (Cell)
- 2- A vital biological process through which a living organism produces new individuals of the same species. (Reproduction)
- 3- Specialized cells responsible for sexual reproduction in living organisms. (Gametes)
- 4- They include all the cells of the living organism, except the reproductive cells. (Somatic cells)
- 5- They are organs responsible for production of reproductive cells. (Gonads)
- 6- Abnormal cell growth formed when a somatic cell undergoes uncontrolled mitotic division repeatedly and abnormally. (Cancerous tumor)
- 7- The re-arrangement of genetic material between homologous chromosomes during the first meiotic division. (Crossing-over phenomenon)
- 8- The form of asexual reproduction that occurs in the potato plant through its tubers. (Vegetative reproduction)
- 9- Type of reproduction that involves two parental individuals. (Sexual reproduction)
- 10- The cell resulting from the process of fertilization. (Zygote)

- 11- A short stem whose leaves are modified to perform the reproductive function. (Flower)
- 12- A cluster of flowers carried by the peduncle. (Inflorescence)
- 13- An inflorescence in which all the pedicels emerge from one point at the end of the peduncle. (Simple umbel inflorescence)
- 14- An inflammation caused by an immune response to harmless substances such as pollen grains. (Hay fever)
- 15- The male reproductive organ in the flower, consisting of several stamens. (Androecium)
- 16- An opening through which the nucleus of the pollen grain reaches the nucleus of the ovule. (Micropyle)
- 17- Stage in which the seed develops into a seedling that begins to emerge from the soil. (Germination)
- \*\*\*\*\*

#### 4) What is meant by:

- 1- **Gonads.**
  - They are the male and female reproductive organs in living organisms.
- 2- **Fertilization.**
  - It is the fusion of the nucleus of a male gamete with the nucleus of a female gamete to form a zygote.
- 3- **Naked flowers (mention an example).**
  - A flower in which sepals and petals are absent such as Willow flowers.
- 4- **Typical flower (mention an example).**
  - The flower whose floral leaves are arranged in four floral whorls such as tomato and eggplant flowers.
- 5- **Pollination.**
  - The process of the transfer of pollen grains from the anthers of the stamens to the stigmas of the carpels (pistils).

\*\*\*\*\*

#### 5) Put (✓) or (x):

- 1- Sperms and pollen grains are female gametes. (x)
- 2- The number of chromosomes in the human somatic cell is equal to half their number in gametes. (x)
- 3- Gametes contain a diploid number of chromosomes. (x)
- 4- There is no relation between the size of the living organism and its chromosome count. (✓)
- 5- The number of chromosomes in the cells of chimpanzee is equal to that in the cells of potato plant. (✓)

- 6- Somatic cell in crow contains 40 pair chromosomes. (✓)
- 7- Division of one cell mitotically produces two cells; each contains half the genetic material present in the parent cell. (x)
- 8- Cancerous tumors result from repeated abnormal meiotic divisions. (x)
- 9- The crossing-over phenomenon occurs during the second meiotic division. (x)
- 10- Potato tubers that reproduce asexually must contain buds. (✓)
- 11- Asexual reproduction produces individuals carrying an exact genetic copy of the parental individual. (✓)
- 12- Vegetative reproduction is one of the forms of sexual reproduction. (x)
- 13- Zygote grows by several meiotic divisions into an embryo. (x)
- 14- The female frog is larger in size than the male frog. (✓)
- 15- Flowering plants are one of the most widespread plants in the world. (✓)
- 16- The flower is a modified leaf. (x)
- 17- In simple corymb inflorescences, the flowers bloom from the center to the outside. (x)
- 18- The number of petals usually equals the number of sepals and alternates with them in position. (✓)
- 19- The number of floral whorls in the typical flower is 3. (x)
- 20- Flowers contain antioxidants and volatile oils. (✓)
- 21- In self-pollinated flowers, the anthers are at a lower level than the stigmas. (x)
- 22- The unisexual flower is cross-pollinated. (✓)
- 23- Wind-pollinated flowers are characterized by long anthers and hanging outside stigmas. (✓)
- 24- In the germination stage, the seed develops into a seedling. (✓)

\*\*\*\*\*

#### 6) Correct the underlined words:

- 1- Gamete cells contain the full number of chromosomes found in somatic cells. (half number)
- 2- In a human female, the number of chromosomes in a liver cell half the number of chromosomes in one of her ovary cells. (equals)
- 3- The number of chromosomes in the cells of elephant is equal to that in the cells of crow. (less than)
- 4- The number of daughter cells resulting from several successive mitotic divisions can be calculated from the relation 2n. ( $2^n$ )
- 5- If a pollen grain of a plant contains 10 chromosomes, so the collenchyma cell in the stem of this plant contains 20 pairs of chromosomes. (10)
- 6- The somatic cells of the living organism contain haploid number of chromosomes. (diploid)



- 7- The first meiotic division is similar to mitotic division. (second)
- 8- The ratio of the number of chromosomes in sperm cell to its number in ovum cell is 2:1. (1:1)
- 9- Mitosis is called reductional division. (equational)
- 10- After the second meiotic division, two cells are produced containing half the original number of chromosomes. (4 cells)
- 11- Pedicel is a swollen part at the end of the flower pedicel that carries the floral whorls. (Receptacle)
- 12- The stamen consists of stigma, style and ovary. (carpel)
- 13- Hibiscus flowers are used in the production of rose water and rose oil. (Egyptian rose)
- 14- The female flower is symbolized by (♀). (bisexual)
- 15- Cross-pollinated flowers are characterized by the simultaneous maturity of the stamens and the pistil. (Self-pollinated)
- 16- Petals of the wind-pollinated flowers have a scent. (insect)
- 17- The ovary that contains more than one pollen grain produces a fruit containing more than one seed. (ovule)
- 18- During the germination stage in flowering plants, plant begins to form its roots, stem and leaves. (vegetative growth)

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**7) Cross out the odd word and write the scientific term of others:**

- 1- Pollen grain / Sperm / Ovum / Muscle cell.  
➤ Scientific term: **Gametes** (cells contain the full number of chromosomes (n)).
- 2- Gonad cells / Gametes cells / Intestinal cells / Cardiac muscle cells.  
➤ Scientific term: **cells contain the full number of chromosomes (2n).**
- 3- Calyx / Corolla / Stem / Stamen/ Pistil.  
➤ Scientific term: **The floral whorls in the typical flower.**
- 4- Sepals / Petals / Tubers / Carpels.  
➤ Scientific term: **The leaves of floral whorls in the female flower.**
- 5- Maize / Palm / Pumpkin / Rose.  
➤ Scientific term: **plants with unisexual flowers.**
- 6- Stigma / Stamen / Style / Ovary.  
➤ Scientific term: **Components of the carpel.**
- 7- Stigma / Filament / Anther / Pollen grains.  
➤ Scientific term: **Components of the stamen.**

**8) Mention the difference between (compare):**

**1- Collenchyma cells and pollen grains in the plant.**

| Collenchyma cells                            | Pollen grains                                                  |
|----------------------------------------------|----------------------------------------------------------------|
| Somatic cells                                | Reproductive cells (gametes)                                   |
| Found in the stems and leaves of plants.     | Found in the male gonads (anther).                             |
| Contain the full number of chromosomes (2n). | Contain half the number of chromosomes found in somatic cells. |

**2- Somatic cells and gonad cells (In terms of: Type of division - Number of daughter cells - Example in plant and animal).**

| P.O.C.                   | Somatic cells                   | Gonad cells                            |
|--------------------------|---------------------------------|----------------------------------------|
| Type of division         | Mitosis.                        | Meiosis.                               |
| Number of daughter cells | Two new diploid daughter cells. | Four haploid daughter cells (gametes). |
| Example in plant         | Parenchyma cells.               | Anther and ovary.                      |
| Example in animal        | Muscle cells.                   | Testes and ovary.                      |

**3- Mitosis and meiosis in terms of Purpose of the division.**

| Mitosis                                                                                                                                                                         | Meiosis                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>1) Growth of the body.</b><br><b>2) Compensation for dead or damaged tissues, such as during wound healing and the repair of blood vessels, muscles, and bone fractures.</b> | <b>1) Formation of gametes inside the gonads.</b><br><b>2) Reduction of the chromosome number to half in the gametes.</b> |

**4- Sexual reproduction and asexual reproduction (In terms of: Number of individuals involved in reproduction – The type of division it depends on – The genetic traits of the resulting offspring).**

| P.O.C.                | Sexual reproduction                                                                     | Asexual reproduction                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Number of individuals | It occurs through 2 parental individual.                                                | It occurs through single parental individual.                                          |
| Type of division      | It depends on meiosis.                                                                  | It depends on mitosis.                                                                 |
| Genetic traits        | It produces new individuals that carry a combination of genetic traits of both parents. | It produces new individuals that carry identical copy of genetic traits of the parent. |

### 5- Stamen and carpel (In terms of: Structure – Function).

| P.O.C.    | Stamen                                                                   | Carpel                                                                |
|-----------|--------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Structure | It consists of: Thin filament and anther.                                | It consists of: Ovary, style and stigma.                              |
| Function  | The male organ of the flower that produces pollen grains (male gametes). | The female organ of the flower that produces ovules (female gametes). |

### 6- Egyptian rose flower and Petunia flower.

| Egyptian rose flower               | Petunia flower                  |
|------------------------------------|---------------------------------|
| It has separate sepals and petals. | It has fused sepals and petals. |

### 7- Self-pollination and cross-pollination.

| Self-pollination                                                                                                                                                | Cross-pollination                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| The process of the transfer of pollen grains from the anther of a flower to the stigma in the same flower or to the stigma in another flower in the same plant. | The process of the transfer of pollen grains from the anther of a flower in a plant to the stigma in another flower in another plant of the same species. |

### 8- Pollen grains carried by wind and pollen grains carried by insects.

| Pollen grains carried by wind    | Pollen grains carried by insects |
|----------------------------------|----------------------------------|
| They are light, dry, and smooth. | They are sticky or rough.        |

\*\*\*\*\*

### 9) Give reason for:

- 1- The somatic cell is symbolized by the symbol (2n), while gamete cell is symbolized by the symbol (n).
  - Because somatic cell contains the full number of chromosomes, while gamete cell contains half the number of chromosomes found in somatic cells.
- 2- The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity.  
(The potato plant and the chimpanzee are not genetically similar although they have the same chromosome count.)
  - Because they carry different genetic information.
- 3- Mitosis is called equational division.
  - Because a complete (2N) and identical set of genetic information is equally distributed to each daughter cell.
- 4- Mitosis is important for the child's body.
  - Because mitotic division leads to growth of the body and compensation for dead or damaged tissues.

**5- Meiosis is called reductional division.**

- Because each produced daughter cell contains half the number of chromosomes (n) that present in the parent cell.

**6- Reduction of the chromosome count to half during meiosis.**

- To ensure the maintenance of a constant chromosome number after fertilization across successive generations.

**7- Meiosis produces genetically different cells.**

- Due to the occurrence of crossing-over phenomenon between homologous chromosomes during the first meiotic division.

**8- Vegetative reproduction in the potato plant is a form of asexual reproduction.**

- Because it occurs through a single parent individual (piece of a potato tuber containing a bud) to produce new individuals that are completely identical in genetic traits to parent.

**9- Asexual reproduction maintains the genetic structure of the living organism.**

- Because it depends on the mitotic division, which leads to the formation of identical copy of the parental individual.

**10- New strains of grapes cannot appear if they are reproduced by vegetative reproduction.**

- Because vegetative reproduction produces individuals completely identical in genetic traits to the parental individual.

**11- Vegetative reproduction is preferred in plants with good genetic traits.**

- Because vegetative reproduction depends on the mitotic division, so it preserves the good genetic traits in the new plants.

**12- Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals.**

**(Individuals produced by sexual reproduction differ genetically from their parents.)**

- Because it depends on meiosis in which crossing-over phenomenon occurs between homologous chromosomes during the first meiotic division.

**13- The inflorescences of the Iberis plant are called simple corymb inflorescences.**

- Because flowers arise only from both sides of the axis and are found at nearly the same level giving the inflorescence a comb-like shape.

**14- The calyx and corolla whorls in the Daffodil plant are called the perianth.**

- Because sepals can't be distinguished from petals based on color or appearance.

**15- The importance of the floral envelope in flowers such as the Narcissus flower.**

- To protect the reproductive organs of the flower.

**16- The tomato flower is a typical flower.**

- Because it contains the four floral whorls.



17- The typical flower is described as bisexual flower.

- Because it contains both the male organ (stamens) and the female organ (pistil).

18- The flower of zucchini plant is unisexual flower.

- Because it contains only the male or the female organ.

19- The petals of rose plant have an economic importance for human.

- Because petals are used in the production of rose water and rose oil.

20- The anthers of some flowers are long and hang outside the flower.

- To be easily opened by winds for completing the pollination process.

21- Pollen grains of wind-pollinated plants are light and smooth.

- To be easily carried by winds.

22- Wind-pollinated plants produce pollen grains in large numbers.

- To compensate for losses in the air.

23- Stigmas of some flowers are feathery and sticky.

- To trap pollen grains.

24- Some flowers have coloured petals and scent.

- To attract insects that play an important role in completing the process of floral reproduction.

25- The anthers of some flowers are located inside the flower.

- Because their filaments are short.

26- Pollen grains of some plants may be sticky or rough.

- To stick on the bodies of insects.

27- Stigmas of some flowers are sticky and are located inside the flower.

- To pick up pollen stuck to the bodies of visiting insects.

28- The peach fruit contains one seed, while the pea fruit contains many seeds.

- Because the ovary of the peach flower plant contains one ovule, while that of the pea plant contains many ovules.

\*\*\*\*\*

10) What are the results of (What happens...)?

1- The division of a liver cell (or somatic cell) in human by mitosis.

- Two new cells genetically identical to the parent cell ( $2n$ ) are produced.

2- The division of an intestinal cell in human through three successive mitotic divisions.

- 8 new cells ( $2^3 = 8$  cells) genetically identical to the parent cell are produced.

3- The division of a gonad cell of a human male by meiosis.

- Four sperm cells are produced, each containing half the number of chromosomes (23 chromosomes) of the parent cell.

**4- Somatic cells in human don't divide mitotically.**

- No body growth can occur and dead or damaged tissues can't be replaced, so the living organism may die.

**5- The gonad cells in human do not divide meiotically.**

- Gametes can't be formed, so sexual reproduction will not occur.

**6- The occurrence of the crossing-over phenomenon during meiosis.**

- It leads to the diversity of genetic traits within individuals of the same species.

**7- The crossing-over phenomenon does not occur.**

- No diversity of genetic traits can occur within individuals of the same species.

**8- The abnormal repeated mitotic divisions of a somatic cell.**

- Cancerous tumor is formed.

**9- The fusion of the nucleus of a male human gamete with the nucleus of a female gamete.**

- Formation of zygote, which carries the full number of chromosomes (2n).

**10- Stamens and carpels mature at the same time in some flowers.**

(Some flowers remain closed and do not bloom until pollination is completed.)

- Self-pollination occurs.

**11- Stamens and carpels do not mature at the same time in some flowers.**

(Anthers are far from the stigmas in some flowers.)

- Cross-pollination occurs.

**12- The gynoecium is removed from a typical flower before it blooms.**

- The flower becomes unisexual (male) and self-pollination can't occur.

**13- Falling of a pollen grain on the stigma of a flower of the same type.**

- Stigma secretes a sugary solution that the pollen grain absorbs to germinate and forms the pollen tube.

**14- Falling of a plant seed into suitable soil.**

- The seed develops into a seedling that begins to emerge from the soil.

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**11) State one importance for each of the following:**

**1- Gametes:** responsible for sexual reproduction in living organisms.

**2- Meiosis in human:** Formation of gametes (sperms and ova) inside the gonads.

**3- Fertilization:** Formation of zygote that contains the full number of chromosomes (2n).

**4- The flower:** The sexual reproductive organ in flowering plants.

5- **The corolla:** Protecting the reproductive organs of the flower and attracting pollinating insects.

6- **Chamomile flowers:** used to calm the nervous system.

7- **Hibiscus flowers:** used to lower high blood pressure.

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12) **Variant questions:**

1- If the number of chromosomes in a stomach cell of an organism is 26 chromosomes.

What are the count chromosomes in one of its reproductive cells?

➤ Number of chromosomes =  $26 \div 2 = 13$  chromosomes.

2- If the number of chromosomes in the ovum of a female animal is 16 chromosomes.

What is the number of chromosomes in the following cells of this animal:

1) Liver cell.

2) Sperm of the male.

➤ Number of chromosomes in the liver cell = 16 pairs =  $16 \times 2 = 32$  chromosomes.

➤ Number of chromosomes in the sperm = 16 chromosomes.

3- Calculate the number of cells resulting from the division of a skin cell through 5 successive mitotic divisions.

➤ Number of resulting cells =  $2^5 = 32$  chromosomes.

4- **The opposite figure represents a vital phenomenon:**

a) What is the name of this phenomenon?

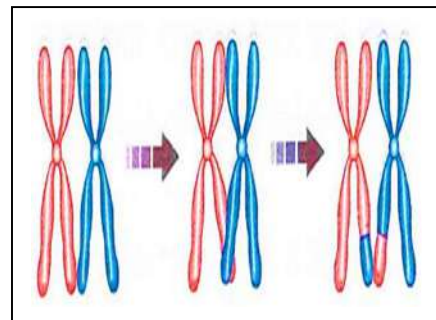
➤ Crossing over phenomenon.

b) In which type of division does this phenomenon occur?

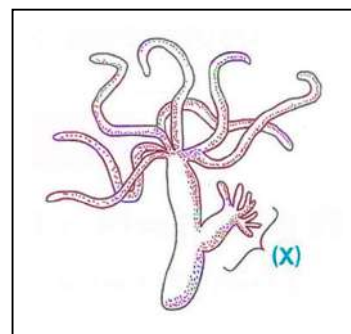
➤ Meiotic division during Meiosis I stage.

c) What is the importance of this phenomenon?

➤ It is an important factor in the diversity of genetic traits among individuals of the same species, where genetic material exchange occurs between the non-sister chromatids of two homologous chromosomes, which are randomly distributed in the gametes responsible for sexual reproduction in living organisms.



5- The opposite figure shows the reproduction of a living organism produced by a single parent:



a) What is the type of this reproduction?

➤ Asexual reproduction.

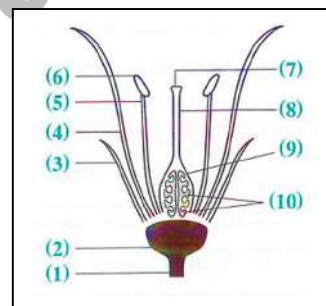
b) Does this reproduction occur through meiosis or mitosis?

➤ Mitosis.

c) What are the genetic traits of the cells in part (X) resulting from the reproduction?

➤ The cells in part (X) carry identical copy of genetic traits (2n) of the parental individual.

6- Study the opposite figure, then answer:



a) Write what the numbers indicate.

(1) Pedicel.

(2) Receptacle.

(3) Sepal.

(4) Petal.

(5) Filament.

(6) Anther.

(7) Stigma.

(8) Style.

(9) Ovary.

(10) Ovules.

b) Complete:

1. Part (3) participates in the formation of a floral whorl called calyx, while part (4) participates in the formation of a floral whorl called corolla.

2. According to sex of the flower, the flower in the opposite diagram is bisexual.

3. The male organ consists of parts number (5) and (6).

4. The female organ consists of parts number (7), (8) and (9).



## Final Revision on unit 4

### 1) Choose the correct answer:

- 1- The main factor that distinguishes weather from climate is.....  
a) latitudes. b) type of wind.  
c) the period of time. d) amount of rainfall.
- 2- All the followings are elements affecting weather and climate, except.....  
a) temperature b) barometer c) solar radiation d) atmospheric pressure
- 3- All the followings are factors affecting the temperature, except.....  
a) latitude b) proximity to water bodies c) altitude d) longitudes
- 4- The temperature is the lowest between the two latitudes.....  
a) 66.5°N- 90°N b) 0° -23.5°S c) 23.5°S -66.5°S d) 23.5°N - 66.5°S
- 5- The..... is located at latitude 0° and bisects the Earth into two halves.  
a) Equator b) Tropic of Cancer c) Tropic of Capricorn d) North Pole
- 6- When a land breeze occurs, the air moves from.....  
a) the sea to the land. b) the land to upwards.  
c) the land to the sea. d) the sea to upwards.
- 7- Atmospheric pressure is measured by.....  
a) mercury thermometer. b) manometer.  
c) mercury barometer. d) anemometer.
- 8- Normal atmospheric pressure equals.....  
a) 1013.25 mm.Hg b) 76mb c) 760 mb d) 76 cm.Hg
- 9- All the followings are measuring units of atmospheric pressure, except.....  
a) mm.Hg b) mb c) g/m<sup>3</sup> d) cm.Hg
- 10- If the height of the mercury column in the mercury barometer at one of the highlands is 639 mm, so the value of atmospheric pressure equals.....mb.  
a) 639 b) 852 c) 940 d) 1010
- 11- The climatic factor that leads to the formation of snow on the summits of some mountains is.....  
a) humidity. b) atmospheric pressure. c) wind. d) temperature.
- 12- The low atmospheric pressure regions are formed at the latitudes of .....  
a) 90°N , 0° b) 30°S , 30°N c) 60°S , 30°N d) 60°S , 0°
- 13- The rotation of the Earth around its axis causes the deflection of winds, which known as.....  
a) greenhouse effect. b) Coriolis effect.  
c) land breeze phenomenon. d) atmospheric pressure.

- 14- Winds are deflected in the Northern Hemisphere to the..... of their original direction.  
a) right                      b) left                      c) east                      d) west
- 15- Winds are deflected in the Southern Hemisphere .....the clockwise direction.  
a) with                      b) perpendicular to                      c) against                      d) parallel to
- 16- A low atmospheric pressure area is represented by the symbol .....in .....colour.  
a) H / blue                      b) H / red                      c) L / blue                      d) L / red
- 17- One of the safety measures during Khamaseen winds is.....  
a) wearing a mask.                      b) traveling by sea.  
c) avoiding crowded places.                      d) irrigating crops.
- 18- Weather forecast aim in protection of lives from.....  
a) earthquakes                      b) thunderstorms                      c) volcanoes                      d) pollution
- 19- .....is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere.  
a) Stevenson screen.                      b) Weather buoys.                      c) Radiosonde.                      d) Satellites
- 20- Among the weather forecasting on the ground techniques are .....  
a) weather buoys and satellites.                      b) Stevenson screen and radiosonde.  
c) weather buoys and radiosonde.                      d) Stevenson screen and weather stations.
- 21- The radiosonde carries instruments to measure all of the following, except .....  
a) temperature.                      b) hurricanes direction.                      c) wind speed.                      d) atmospheric pressure.
- 22- .....is used for landing the radiosonde device to Earth after the balloon bursts.  
a) Parachute                      b) Buoys                      c) Rocket                      d) Satellites
- 23- All of the following are fields of benefit from weather forecasts, except.....  
a) aviation safety.                      b) prevention of thunderstorms.  
c) supporting economic activities.                      d) protection of property and lives.

\*\*\*\*\*

**2) Complete the following statements:**

- 1- .....is the most important climatic element affecting the life of living organisms.
- 2- Caracal is an animal of the .....region, while the ..... is an animal of northern polar region.
- 3- The temperature .....as the latitude increases north and south of the Equator.

- 4- The thermal zone extending between latitudes  $23.5^{\circ}\text{N}$  ,  $66.5^{\circ}\text{N}$  is called .....zone.
- 5- The tropic of .....is located at latitude  $23.5^{\circ}\text{S}$ , while the tropic of .....is located at latitude  $23.5^{\circ}\text{N}$ .
- 6- The .....temperature is the highest temperature in one day, while the .....temperature is the lowest temperature in one day.
- 7- When moving farther from the Equator to the north or south, the inclination of the Sun rays .....and the temperature .....
- 8- As we go higher above the sea level, the air density .....and the temperature .....
- 9- The .....breeze blows at night, while the .....breeze blows during the daytime.
- 10- The density of humid air is .....than the density of dry air.
- 11- Atmospheric pressure is measured in .....or ..... units.
- 12- Among the factors affecting atmospheric pressure are altitude above sea level, .....and .....
- 13- Atmospheric pressure decreases as .....and .....increase.
- 14- Air always moves from areas of .....atmospheric pressure to areas of .....atmospheric pressure in the form of .....
- 15- As the difference in atmospheric pressure between adjacent areas increases, wind .....and .....increase.
- 16- A high atmospheric pressure area is represented by the symbol ..... in .....colour.
- 17- The .....effect is responsible for winds moving in curved paths.
- 18- Air currents in a low-pressure area are ....., leading to .....formation.
- 19- Weather maps show the movement of air masses based on the speed of ..... and .....systems.
- 20- .....maps show symbols that indicate the weather conditions.
- 21- ..... used to collect data in oceans and transmit it via satellites.
- 22- .....or .....gases used in radiosonde balloons because of their .....densities.
- 23- The radiosonde balloon bursts at altitudes between .....km and .....km, then the radiosonde falls using a .....

### 3) Write the scientific term:

- 1- The atmosphere condition in a certain place over a long period of time.
- 2- The latitude that bisects the Earth's surface.
- 3- The thermal zone located between the tropic of Cancer and the tropic of Capricorn.
- 4- The arithmetic mean of the maximum and minimum temperatures for one day.
- 5- The weight of a column of air with a cross-sectional area of  $1 \text{ m}^2$  and a height extending to the top of the atmosphere.
- 6- It equals the weight of a column of mercury 76 cm high acting on a unit area.
- 7- The actual mass of water vapour present in a certain volume of atmospheric air.
- 8- The percentage of absolute humidity to the maximum capacity at the same temperature.
- 9- Curved lines on weather maps connecting points of equal atmospheric pressure.
- 10- Predicting future weather conditions in a certain place.
- 11- A white wooden box with slanted openings that protects temperature-measuring instruments.
- 12- Satellites that rotate around the Earth to provide comprehensive weather images and data.
- 13- Seasonal winds in Egypt carrying sand and dust and affecting health.

\*\*\*\*\*

### 4) What is meant by:

- 1- Daily temperature range.

➤ .....  
.....

- 2- Normal atmospheric pressure.

➤ .....  
.....

- 3- Humidity.

➤ .....  
.....

- 4- Wind.

➤ .....  
.....



**5) Put (✓) or (x):**

- 1- When it is said that the weather is hot and humid over Cairo today, it talks about the climate of the area. ( )
- 2- The difference in latitudes affects the temperature of the weather. ( )
- 3- Solar radiation is one of the elements of climate and weather. ( )
- 4- The Sun rays fall perpendicular to the temperate zone. ( )
- 5- The North Pole is located at latitude 90°S. ( )
- 6- The density of air decreases with increasing altitude above the sea level. ( )
- 7- The air above the sea at night is colder than the air above the land. ( )
- 8- Atmospheric air has weight and pressure. ( )
- 9- When the trapped air inside a closed space is heated, the pressure increases as a result of constant volume. ( )
- 10- Each 1 mb is equivalent to 75 mm.Hg. ( )
- 11- Value of humidity varies from one place to another and over time. ( )
- 12- The effect of temperature appears clearly on atmospheric pressure and wind. ( )
- 13- The dryness of the mucous membranes decreases the chances of infecting by influenza. ( )
- 14- Wind speed increases when the difference in atmospheric pressure is large. ( )
- 15- Winds move in completely straight paths from the poles to the equator. ( )
- 16- In the Northern Hemisphere, air within low-pressure systems rotates inward toward the center in an anticlockwise direction. ( )
- 17- As a result of the rotation of the Earth around its axis, wind moves in straight paths. ( )
- 18- Weather forecasting is achieved by collecting, recording, and analyzing data. ( )
- 19- A weather forecast for two days is more accurate than a one week forecast. ( )
- 20- At the center of a low-pressure system, pressure values are higher than that in surrounding areas. ( )
- 21- Cold, moist air in polar regions forms a high-pressure area. ( )
- 22- Weather stations used for collecting and recording weather data. ( )
- 23- Storm tracks can be predicted by satellites. ( )
- 24- The radiosonde is launched once every day. ( )
- 25- Weather forecasts help farmers determine the times of planting, irrigation and harvesting. ( )
- 26- Weather forecasting is absolute facts. ( )
- 27- Aircraft navigation mainly depends on knowing weather maps. ( )

**6) Correct the underlined words:**

- 1- The Sun rays fall inclined on the Equator.
- 2- The temperature increases as we move away from the Equator.
- 3- The hot zone located between latitudes 66.5°, 90° north or south.
- 4- Atmospheric pressure decreases slightly as wind speed increases.
- 5- The barometer is used to measure the temperature.
- 6- Winds arise as a result of differences in humidity between neighboring areas.
- 7- Wind deflection is greatest at the Equator.
- 8- At the equator, wind paths are curved.
- 9- Wind is the vertical movement of air upward or downward on the Earth's surface.
- 10- A low-pressure area (L) forms at the poles.
- 11- Lines of equal pressure are called isotones.
- 12- Air currents in a high-pressure area are ascending, leading to dry and clear weather.
- 13- The structure of the Stevenson screen is painted green.
- 14- The radiosonde is known as the electronic probe.
- 15- Khamaseen winds blow in the autumn season.

\*\*\*\*\*

**7) Cross out the odd word and write the scientific term of others:**

- 1- Temperature / Acceleration / Atmospheric pressure / Wind.  
➤ Scientific term: .....
- 2- Latitudes / Proximity to water bodies / Altitude above the sea level / Longitudes.  
➤ Scientific term: .....
- 3- Stevenson screen / Weather buoys / Spring balance / Radiosonde.  
➤ Scientific term: .....

\*\*\*\*\*

**8) Mention the difference between (compare):**

- 1- Weather and Climate in term of definition.
- 2- Land breeze and sea breeze in term of definition.
- 3- The high atmospheric pressure system and low atmospheric pressure system.
- 4- The wind movement in both the Earth's hemispheres.

9) Give reason for:

- 1- The temperature is considered the most important element of climate.  
➤ .....
- 2- Increasing the temperature near the Equator.  
➤ .....
- 3- Temperature decreases by moving farther from the Equator.  
➤ .....
- 4- The variation of thermal zones on the Earth's surface.  
➤ .....
- 5- Occurrence of sea breeze and land breeze phenomena.  
(The temperature of sea water is less than the temperature of the land adjacent to it during the daytime.)  
➤ .....
- 6- The daily average temperature differs from one city to another.  
➤ .....
- 7- Decreasing of the temperature with increasing altitude above the sea level.  
➤ .....
- 8- Decreasing the atmospheric pressure by moving higher above sea level.  
➤ .....
- 9- Decreasing the atmospheric pressure when the temperature of the air increases.  
➤ .....
- 10- Atmospheric pressure decreases slightly as humidity increases.  
➤ .....
- 11- The spread of influenza increases during winter.  
➤ .....
- 12- The wind moves horizontally from one region to another on the Earth's surface.  
➤ .....
- 13- The air currents formed in areas of different pressure systems are not alike.  
➤ .....
- 14- The wind moves in curved paths.  
➤ .....
- 15- There is no deflection of the wind path at the Equator.  
(The wind moves in straight path at the Equator.)  
➤ .....
- 16- Clouds and rain are formed at low-pressure system.  
➤ .....

17- Clear weather at high-pressure system.

➤ .....

18- The Weather Kiosk (Stevenson screen) is painted white.

➤ .....

19- The Stevenson screen is placed away from trees and buildings.

➤ .....

20- The Stevenson screen is raised 120 cm above ground level.

➤ .....

21- The presence of slanted openings in the walls of The Stevenson screen.

➤ .....

22- The radiosonde balloon bursts when it reaches high altitudes.

➤ .....

23- Weather forecasts are not absolute facts (probabilistic predictions).

(The accuracy of weather forecasts decreases as the time period increases.)

➤ .....

24- The importance of satellites in meteorology.

➤ .....

25- Khamaseen winds have harmful health effects.

➤ .....

\*\*\*\*\*

### 10) What are the results of (What happens...)?

1- Cairo is located at latitude  $30^{\circ}\text{N}$ .

➤ .....

2- Increasing altitude above sea level (Regarding the temperature, air density and atmospheric pressure).

➤ .....

3- Increase both the maximum and minimum temperatures.

➤ .....

4- The specific heat of water differs from that of land at night.

➤ .....

5- To the height of the Torricelli's vacuum in the mercury barometer when atmospheric pressure increases.

➤ .....

6- Increase in humidity in a certain place according to atmospheric pressure.

➤ .....



- 7- Heating the air inside buildings while absolute humidity remains constant.  
➤ .....
- 8- Increasing the temperature and humidity percentage in the tropical regions.  
➤ .....
- 9- Decreasing the temperature and humidity percentage in the polar regions.  
➤ .....
- 10- The difference in the values of atmospheric pressure in nearby regions.  
➤ .....
- 11- The difference between atmospheric pressure values in adjacent regions increases.  
➤ .....
- 12- Atmospheric pressure became equal between two cities.  
➤ .....
- 13- Decreasing the temperature of air that saturated with water vapor.  
➤ .....
- 14- The Earth stopped rotating.  
➤ .....
- 15- Meteorological satellites disappeared.  
➤ .....  
\*\*\*\*\*

#### 11) Problems:

- 1- Calculate the daily temperature range and the daily average temperature in Al-Sharqia governorate on a day in April, knowing that the maximum temperature was 33°C and the minimum was 14°C.  
.....  
.....  
\*\*\*\*\*
- 2- If the atmospheric pressure in one area is 675 mm.Hg, calculate its value in mb.  
.....  
.....  
\*\*\*\*\*
- 3- An amount of air with a volume of 20 m<sup>3</sup> contains an amount of water vapour with a mass of 120 g and the maximum mass of water vapour that can be present in 1 m<sup>3</sup> of air is 10 g. calculate absolute humidity and relative humidity.  
.....  
.....

- 4- One cubic meter of air in a certain region becomes saturated with 20 g of water vapour at 20°C. Calculate the relative humidity in this region if one cubic meter of its air contains 10 g of water vapour at 20°C.

.....  
 .....

\*\*\*\*\*

12) State one importance for each of the following:

- 1- Mercury barometer.

.....

- 2- Weather maps.

.....

- 3- Weather forecast icons.

.....

- 4- Weather forecasts for farmers.

.....

- 5- Stevenson screen.

.....

- 6- Radio waves for the radiosonde.

.....

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13) Study the following figures then answer:

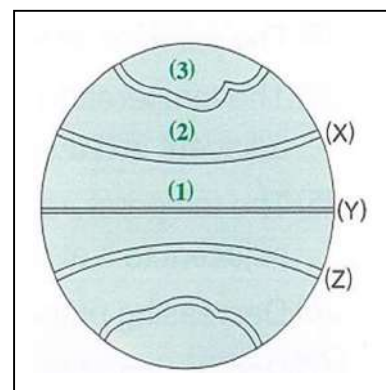
- 1- The opposite figure shows the main latitudes of the Earth's surface, complete:

- a) The latitude (Y) represents the .....whose degree is .....°.

- b) The latitude (X) represents the ....., while the latitude (Z) represents the .....

- c) The thermal zone indicated by the number (1) is called the .....zone and is located between the degree of .....°, .....° north or south.

- d) The thermal zone indicated by the number (2) is called the .....zone, while that indicated by the number (3) is called the ..... zone.



2- Study the opposite figure then answer:

a) What is the name of this device?

➤ .....

b) What is part (1) called?

➤ .....

c) What is the name of the substance (2)?

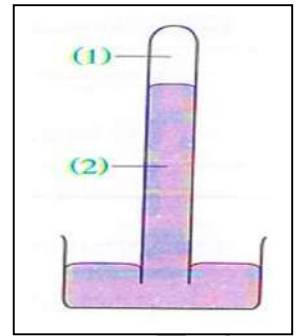
➤ .....

d) What happens to the height of parts number (1) and (2) when atmospheric pressure decreases.

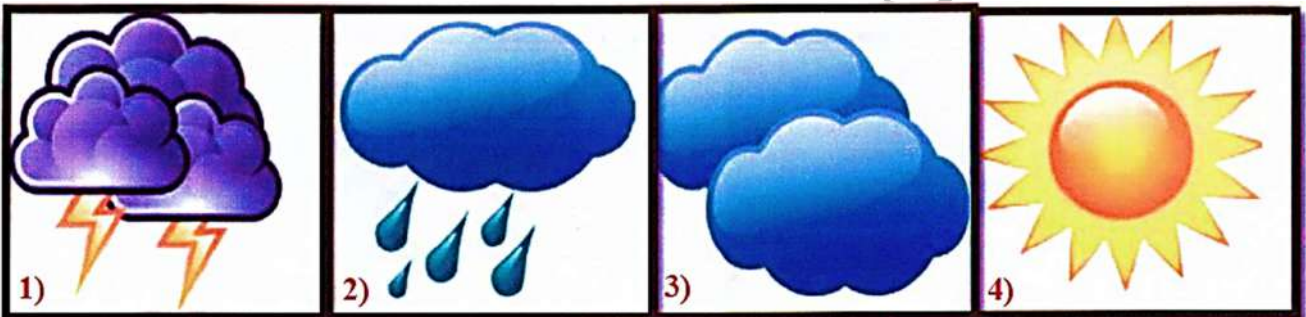
➤ .....

.....

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3- Identify the symbols:



a) The symbol number (1) represents .....

b) The symbol number (2) represents .....

c) The symbol number (3) represents .....

d) The symbol number (4) represents .....

## Final Revision on unit 4 (answered)

### 1) Choose the correct answer:

- 1- The main factor that distinguishes weather from climate is.....
  - a) latitudes.
  - b) type of wind.
  - c) the period of time.
  - d) amount of rainfall.
- 2- All the followings are elements affecting weather and climate, except.....
  - a) temperature
  - b) barometer
  - c) solar radiation
  - d) atmospheric pressure
- 3- All the followings are factors affecting the temperature, except.....
  - a) latitude
  - b) proximity to water bodies
  - c) altitude
  - d) longitudes
- 4- The temperature is the lowest between the two latitudes.....
  - a) 66.5°N- 90°N
  - b) 0° -23.5°S
  - c) 23.5°S -66.5°S
  - d) 23.5°N - 66.5°S
- 5- The..... is located at latitude 0° and bisects the Earth into two halves.
  - a) Equator
  - b) Tropic of Cancer
  - c) Tropic of Capricorn
  - d) North Pole
- 6- When a land breeze occurs, the air moves from.....
  - a) the sea to the land.
  - b) the land to upwards.
  - c) the land to the sea.
  - d) the sea to upwards.
- 7- Atmospheric pressure is measured by.....
  - a) mercury thermometer.
  - b) manometer.
  - c) mercury barometer.
  - d) anemometer.
- 8- Normal atmospheric pressure equals.....
  - a) 1013.25 mm.Hg
  - b) 76mb
  - c) 760 mb
  - d) 76 cm.Hg
- 9- All the followings are measuring units of atmospheric pressure, except.....
  - a) mm.Hg
  - b) mb
  - c) g/m<sup>3</sup>
  - d) cm.Hg
- 10- If the height of the mercury column in the mercury barometer at one of the highlands is 639 mm, so the value of atmospheric pressure equals.....mb.
  - a) 639
  - b) 852
  - c) 940
  - d) 1010
- 11- The climatic factor that leads to the formation of snow on the summits of some mountains is.....
  - a) humidity.
  - b) atmospheric pressure.
  - c) wind.
  - d) temperature.
- 12- The low atmospheric pressure regions are formed at the latitudes of .....
  - a) 90°N , 0°
  - b) 30°S , 30°N
  - c) 60°S , 30°N
  - d) 60°S , 0°
- 13- The rotation of the Earth around its axis causes the deflection of winds, which known as.....
  - a) greenhouse effect.
  - b) Coriolis effect.
  - c) land breeze phenomenon.
  - d) atmospheric pressure.



- 14- Winds are deflected in the Northern Hemisphere to the..... of their original direction.  
a) right                      b) left                      c) east                      d) west
- 15- Winds are deflected in the Southern Hemisphere .....the clockwise direction.  
a) with                      b) perpendicular to                      c) against                      d) parallel to
- 16- A low atmospheric pressure area is represented by the symbol .....in .....colour.  
a) H / blue                      b) H / red                      c) L / blue                      d) L / red
- 17- One of the safety measures during Khamaseen winds is.....  
a) wearing a mask.                      b) traveling by sea.  
c) avoiding crowded places.                      d) irrigating crops.
- 18- Weather forecast aim in protection of lives from.....  
a) earthquakes                      b) thunderstorms                      c) volcanoes                      d) pollution
- 19- .....is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere.  
a) Stevenson screen.                      b) Weather buoys.                      c) Radiosonde.                      d) Satellites
- 20- Among the weather forecasting on the ground techniques are .....  
a) weather buoys and satellites.                      b) Stevenson screen and radiosonde.  
c) weather buoys and radiosonde.                      d) Stevenson screen and weather stations.
- 21- The radiosonde carries instruments to measure all of the following, except .....  
a) temperature.                      b) hurricanes direction.                      c) wind speed.                      d) atmospheric pressure.
- 22- .....is used for landing the radiosonde device to Earth after the balloon bursts.  
a) Parachute                      b) Buoys                      c) Rocket                      d) Satellites
- 23- All of the following are fields of benefit from weather forecasts, except.....  
a) aviation safety.                      b) prevention of thunderstorms.  
c) supporting economic activities.                      d) protection of property and lives.

\*\*\*\*\*

2) Complete the following statements:

- 1- Temperature is the most important climatic element affecting the life of living organisms.
- 2- Caracal is an animal of the hot region, while the polar bear is an animal of northern polar region.
- 3- The temperature decreases as the latitude increases north and south of the Equator.

- 4- The thermal zone extending between latitudes  $23.5^{\circ}\text{N}$  ,  $66.5^{\circ}\text{N}$  is called temperate zone.
- 5- The tropic of Capricorn is located at latitude  $23.5^{\circ}\text{S}$ , while the tropic of Cancer is located at latitude  $23.5^{\circ}\text{N}$ .
- 6- The maximum temperature is the highest temperature in one day, while the minimum temperature is the lowest temperature in one day.
- 7- When moving farther from the Equator to the north or south, the inclination of the Sun rays increases and the temperature decreases.
- 8- As we go higher above the sea level, the air density decreases and the temperature decreases.
- 9- The land breeze blows at night, while the sea breeze blows during the daytime.
- 10- The density of humid air is less than the density of dry air.
- 11- Atmospheric pressure is measured in millibar or millimeter mercury units.
- 12- Among the factors affecting atmospheric pressure are altitude above sea level, temperature and humidity.
- 13- Atmospheric pressure decreases as temperature and humidity increase.
- 14- Air always moves from areas of high atmospheric pressure to areas of low atmospheric pressure in the form of wind.
- 15- As the difference in atmospheric pressure between adjacent areas increases, wind speed and strength increase.
- 16- A high atmospheric pressure area is represented by the symbol (H) in blue colour.
- 17- The Coriolis effect is responsible for winds moving in curved paths.
- 18- Air currents in a low-pressure area are rising (ascending), leading to cloud formation.
- 19- Weather maps show the movement of air masses based on the speed of wind and atmospheric pressure systems.
- 20- Weather forecast maps show symbols that indicate the weather conditions.
- 21- Weather (or Meteorological) buoys used to collect data in oceans and transmit it via satellites.
- 22- Helium or hydrogen gases used in radiosonde balloons because of their low densities.
- 23- The radiosonde balloon bursts at altitudes between 20 km and 35 km, then the radiosonde falls using a parachute.

### 3) Write the scientific term:

- 1- The atmosphere condition in a certain place over a long period of time. (Climate)
  - 2- The latitude that bisects the Earth's surface. (Equator)
  - 3- The thermal zone located between the tropic of Cancer and the tropic of Capricorn. (Hot (tropical) zones)
  - 4- The arithmetic mean of the maximum and minimum temperatures for one day. (Daily average temperature)
  - 5- The weight of a column of air with a cross-sectional area of 1 m<sup>2</sup> and a height extending to the top of the atmosphere. (Atmospheric pressure)
  - 6- It equals the weight of a column of mercury 76 cm high acting on a unit area. (Normal atmospheric pressure)
  - 7- The actual mass of water vapour present in a certain volume of atmospheric air. (Absolute humidity)
  - 8- The percentage of absolute humidity to the maximum capacity at the same temperature. (Relative humidity)
  - 9- Curved lines on weather maps connecting points of equal atmospheric pressure. (Isobars)
  - 10- Predicting future weather conditions in a certain place. (Weather forecasting)
  - 11- A white wooden box with slanted openings that protects temperature-measuring instruments. (Stevenson screen)
  - 12- Satellites that rotate around the Earth to provide comprehensive weather images and data. (Meteorological satellites)
  - 13- Seasonal winds in Egypt carrying sand and dust and affecting health. (Khamaseen winds)
- \*\*\*\*\*

### 4) What is meant by:

- 1- **Daily temperature range.**
  - The difference between the maximum and minimum temperatures for one day.
- 2- **Normal atmospheric pressure.**
  - It is the atmospheric pressure at sea level.
- 3- **Humidity.**
  - It is the amount of water vapour present in the air.
- 4- **Wind.**
  - It is the horizontal movement of air across the Earth's surface, caused by difference in atmospheric pressure between regions.

**5) Put (✓) or (x):**

- 1- When it is said that the weather is hot and humid over Cairo today, it talks about the climate of the area. (x)
- 2- The difference in latitudes affects the temperature of the weather. (✓)
- 3- Solar radiation is one of the elements of climate and weather. (✓)
- 4- The Sun rays fall perpendicular to the temperate zone. (x)
- 5- The North Pole is located at latitude 90°S. (x)
- 6- The density of air decreases with increasing altitude above the sea level. (✓)
- 7- The air above the sea at night is colder than the air above the land. (x)
- 8- Atmospheric air has weight and pressure. (✓)
- 9- When the trapped air inside a closed space is heated, the pressure increases as a result of constant volume. (✓)
- 10- Each 1 mb is equivalent to 75 mm.Hg. (x)
- 11- Value of humidity varies from one place to another and over time. (✓)
- 12- The effect of temperature appears clearly on atmospheric pressure and wind. (✓)
- 13- The dryness of the mucous membranes decreases the chances of infecting by influenza. (x)
- 14- Wind speed increases when the difference in atmospheric pressure is large. (✓)
- 15- Winds move in completely straight paths from the poles to the equator. (x)
- 16- In the Northern Hemisphere, air within low-pressure systems rotates inward toward the center in an anticlockwise direction. (✓)
- 17- As a result of the rotation of the Earth around its axis, wind moves in straight paths. (x)
- 18- Weather forecasting is achieved by collecting, recording, and analyzing data. (✓)
- 19- A weather forecast for two days is more accurate than a one week forecast. (✓)
- 20- At the center of a low-pressure system, pressure values are higher than that in surrounding areas. (x)
- 21- Cold, moist air in polar regions forms a high-pressure area. (x)
- 22- Weather stations used for collecting and recording weather data. (✓)
- 23- Storm tracks can be predicted by satellites. (✓)
- 24- The radiosonde is launched once every day. (x)
- 25- Weather forecasts help farmers determine the times of planting, irrigation and harvesting. (✓)
- 26- Weather forecasting is absolute facts. (x)
- 27- Aircraft navigation mainly depends on knowing weather maps. (✓)



**6) Correct the underlined words:**

- 1- The Sun rays fall inclined on the Equator. (perpendicular)
- 2- The temperature increases as we move away from the Equator. (decreases)
- 3- The hot zone located between latitudes 66.5°, 90° north or south. (cold or polar)
- 4- Atmospheric pressure decreases slightly as wind speed increases. (humidity)
- 5- The barometer is used to measure the temperature. (atmospheric pressure)
- 6- Winds arise as a result of differences in humidity between neighboring areas. (atmospheric pressure)
- 7- Wind deflection is greatest at the Equator. (poles)
- 8- At the equator, wind paths are curved. (straight)
- 9- Wind is the vertical movement of air upward or downward on the Earth's surface. (Air current)
- 10- A low-pressure area (L) forms at the poles. (Equator)
- 11- Lines of equal pressure are called isotones. (isobars)
- 12- Air currents in a high-pressure area are ascending, leading to dry and clear weather. (descending)
- 13- The structure of the Stevenson screen is painted green. (white)
- 14- The radiosonde is known as the electronic probe. (radio)
- 15- Khamaseen winds blow in the autumn season. (spring)

\*\*\*\*\*

**7) Cross out the odd word and write the scientific term of others:**

- 1- Temperature / Acceleration / Atmospheric pressure / Wind.  
➤ Scientific term: **Elements of weather and climate.**
- 2- Latitudes / Proximity to water bodies / Altitude above the sea level / Longitudes.  
➤ Scientific term: **Factors affecting the temperature.**
- 3- Stevenson screen / Weather buoys / Spring balance / Radiosonde.  
➤ Scientific term: **Techniques used in collecting weather data.**

\*\*\*\*\*

**8) Mention the difference between (compare):**

- 1- **Weather and Climate in term of definition.**

| Weather                                                                                | Climate                                                                        |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| It is the overall instantaneous condition of the atmosphere at certain place and time. | It is the atmospheric condition in a certain place over a long period of time. |

## 2- Land breeze and sea breeze in term of definition.

| Land breeze                                                                      | Sea breeze                                                                 |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| The movement of cool, relatively dry air from the land towards the sea at night. | The movement of cool, refreshing air from sea towards land during the day. |

## 3- The high atmospheric pressure system and low atmospheric pressure system.

| High-pressure system                                                                                                 | Low-pressure system                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| A region where the atmospheric pressure value at its center is higher than that in the surrounding areas.            | A region where the atmospheric pressure value at its center is lower than that in the surrounding areas.            |
| The values of atmospheric pressure of isobars decrease as you move away from the center of the high-pressure system. | The values of atmospheric pressure of isobars increase as you move away from the center of the low-pressure system. |

## 4- The wind movement in both the Earth's hemispheres.

| Northern Hemisphere                                                          | Southern Hemisphere                                                              |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Wind deflects to the right of their original path, in a clockwise direction. | Wind deflects to the left of their original path, in an anticlockwise direction. |

\*\*\*\*\*

## 9) Give reason for:

### 1- The temperature is considered the most important element of climate.

- Due to its direct impact on human life and on the distribution of plants and animals on the surface of the Earth.

### 2- Increasing the temperature near the Equator.

- Because the Sun rays fall perpendicular to these areas.

### 3- Temperature decreases by moving farther from the Equator.

- Because the angle of inclination of the Sun rays increases.

### 4- The variation of thermal zones on the Earth's surface.

- Due to the difference in the angle of inclination of the Sun rays falling on these areas.

### 5- Occurrence of sea breeze and land breeze phenomena.

(The temperature of sea water is less than the temperature of the land adjacent to it during the daytime.)

- Because the specific heat of water in water bodies is higher than that of the land.

### 6- The daily average temperature differs from one city to another.

- Due to difference in both the maximum and minimum temperatures from one city to another.

- 7- Decreasing of the temperature with increasing altitude above the sea level.
- Due to the expansion of air and the decrease in its density.
- 8- Decreasing the atmospheric pressure by moving higher above sea level.
- Due to the decrease in the weight of the air column acting on the unit area.
- 9- Decreasing the atmospheric pressure when the temperature of the air increases.
- Due to the expansion of air and the decrease in its density.
- 10- Atmospheric pressure decreases slightly as humidity increases.
- Because the density of water vapour is less than the density of dry air.
- 11- The spread of influenza increases during winter.
- Because cold air has low humidity that causes the rapid evaporation of the respiratory droplets carrying the viruses, allowing the viruses to remain suspended in the air for longer periods of time.
- 12- The wind moves horizontally from one region to another on the Earth's surface.
- Due to difference in atmospheric pressure between regions due to unequal heating of the Earth's surface.
- 13- The air currents formed in areas of different pressure systems are not alike.
- Because the temperature and humidity differ in the tropical regions compared to the polar regions.
- 14- The wind moves in curved paths.
- Due to the Coriolis Effect caused by the Earth's rotation around its axis.
- 15- There is no deflection of the wind path at the Equator.
- (The wind moves in straight path at the Equator.)
- Due to the absence of the Coriolis effect at the Equator.
- 16- Clouds and rain are formed at low-pressure system.
- Because the ascending air currents in these regions lead to their cooling and condensation.
- 17- Clear weather at high-pressure system.
- Because the descending air currents in these regions lead to their warming and drying.
- 18- The Weather Kiosk (Stevenson screen) is painted white.
- To reflect the sunlight.
- 19- The Stevenson screen is placed away from trees and buildings.
- To avoid any obstacles that may affect the measurements.
- 20- The Stevenson screen is raised 120 cm above ground level.
- To protect instruments inside it from heat radiated by the Earth's surface.
- 21- The presence of slanted openings in the walls of The Stevenson screen.
- To allow air circulation.

22- The radiosonde balloon bursts when it reaches high altitudes.

- Because the balloon expands due to decreasing atmospheric pressure.

23- Weather forecasts are not absolute facts (probabilistic predictions).

(The accuracy of weather forecasts decreases as the time period increases.)

- Because the atmosphere is affected by many interacting variables.

24- The importance of satellites in meteorology.

- Because they rotate around the Earth to provide comprehensive weather images and data.

25- Khamaseen winds have harmful health effects.

- Because they carry sand and dust that negatively affect the respiratory system.

\*\*\*\*\*

10) What are the results of (What happens...)?

1- Cairo is located at latitude 30°N.

- Cairo is located in the temperate zone.

2- Increasing altitude above sea level (Regarding the temperature, air density and atmospheric pressure).

- The temperature, air density and atmospheric pressure decrease.

3- Increase both the maximum and minimum temperatures.

- Daily average temperature increases and weather becomes hot.

4- The specific heat of water differs from that of land at night.

- Land breeze phenomenon occurs.

5- To the height of the Torricelli's vacuum in the mercury barometer when atmospheric pressure increases.

- The length of the Torricelli's vacuum decreases.

6- Increase in humidity in a certain place according to atmospheric pressure.

- Atmospheric pressure decreases slightly.

7- Heating the air inside buildings while absolute humidity remains constant.

- The relative humidity decreases sharply.

8- Increasing the temperature and humidity percentage in the tropical regions.

- Formation of low atmospheric pressure region.

9- Decreasing the temperature and humidity percentage in the polar regions.

- Formation of high atmospheric pressure region.

10- The difference in the values of atmospheric pressure in nearby regions.

- Air moves from regions of high atmospheric pressure to regions of low atmospheric pressure in the form of wind.



11- The difference between atmospheric pressure values in adjacent regions increases.

➤ Wind speed and strength increase.

12- Atmospheric pressure became equal between two cities.

➤ Air doesn't move in the form of wind.

13- Decreasing the temperature of air that saturated with water vapor.

➤ It cools and condenses, leading to cloud formation and rainfall.

14- The Earth stopped rotating.

➤ The wind moves in a straight path without deflection due to absence of the Coriolis effect.

15- Meteorological satellites disappeared.

➤ Meteorologists can't get comprehensive weather images and data.

\*\*\*\*\*

### 11) Problems:

1- Calculate the daily temperature range and the daily average temperature in Al-Sharqia governorate on a day in April, knowing that the maximum temperature was 33°C and the minimum was 14°C.

$$\text{Daily temperature range} = 33 - 14 = 19^{\circ}\text{C}$$

$$\text{Daily average temperature} = \frac{33 + 14}{2} = 23.5^{\circ}\text{C}$$

\*\*\*\*\*

2- If the atmospheric pressure in one area is 675 mm.Hg, calculate its value in mb.

$$\text{Atmospheric pressure} = 675 \div 0.75 = 900 \text{ mb.}$$

\*\*\*\*\*

3- An amount of air with a volume of 20 m<sup>3</sup> contains an amount of water vapour with a mass of 120 g and the maximum mass of water vapour that can be present in 1 m<sup>3</sup> of air is 10 g. calculate absolute humidity and relative humidity.

$$\text{Absolute humidity} = \frac{120}{20} = 6 \text{ g/m}^3$$

$$\text{Relative humidity} = \frac{6}{10} \times 100\% = 60 \%$$

\*\*\*\*\*

4- One cubic meter of air in a certain region becomes saturated with 20 g of water vapour at 20°C. Calculate the relative humidity in this region if one cubic meter of its air contains 10 g of water vapour at 20°C.

$$\text{Absolute humidity} = \frac{10}{1} = 10 \text{ g/m}^3$$

$$\text{Relative humidity} = \frac{10}{20} \times 100\% = 50 \%$$

**12) State one importance for each of the following:**

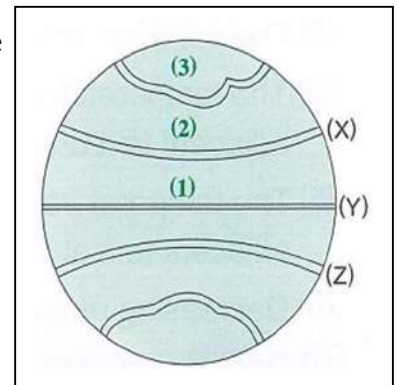
- 1- Mercury barometer:** a device used to measure atmospheric pressure.
- 2- Weather maps:** show the movement of air masses from one region to another based on wind speed and atmospheric pressure systems.
- 3- Weather forecast icons:** used in weather forecast maps to indicate weather conditions.
- 4- Weather forecasts for farmers:** helping farmers determine times of planting, irrigation, harvesting, and pest control that increases agricultural productivity and reduces losses.
- 5- Stevenson screen:** carry and protect instruments used to measure temperature, atmospheric pressure, and humidity.
- 6- Radio waves for the radiosonde:** sending data collected by the sensors of radiosonde to ground stations.

\*\*\*\*\*

**13) Study the following figures then answer:**

**1- The opposite figure shows the main latitudes of the Earth's surface, complete:**

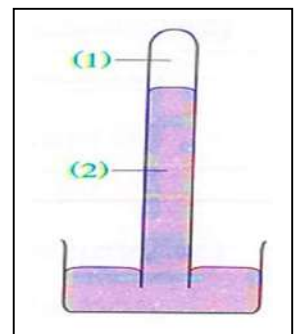
- a) The latitude (Y) represents the Equator whose degree is 0°.
- b) The latitude (X) represents the Tropic of Cancer, while the latitude (Z) represents the Tropic of Capricorn.
- c) The thermal zone indicated by the number (1) is called the hot (tropical) zone and is located between the degree of 0°, 23.5° north or south.
- d) The thermal zone indicated by the number (2) is called the temperate zone, while that indicated by the number (3) is called the cold (polar) zone.



\*\*\*\*\*

**2- Study the opposite figure then answer:**

- a) What is the name of this device?  
➤ Mercury barometer.
- b) What is part (1) called?  
➤ Torricelli's vacuum.
- c) What is the name of the substance (2)?  
➤ Mercury.

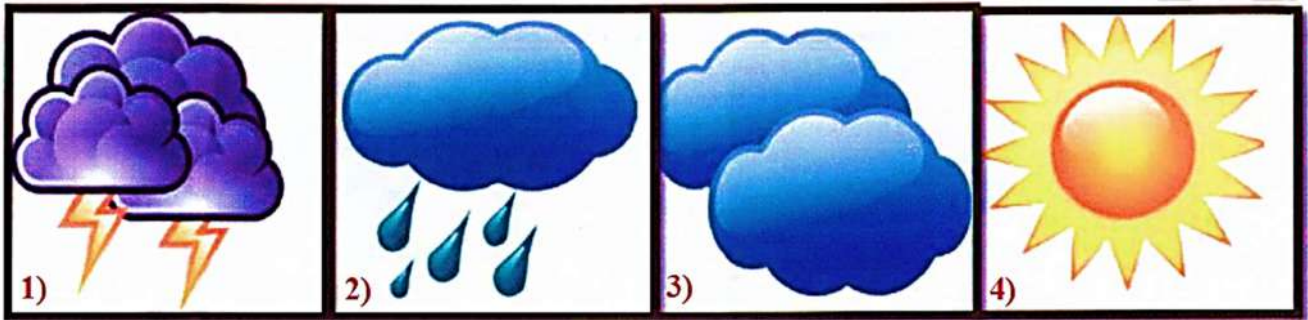


d) What happens to the height of parts number (1) and (2) when atmospheric pressure decreases.

- The length of the mercury column decreases, while the length of the Torricelli's vacuum increases.

\*\*\*\*\*

3- Identify the symbols:



- a) The symbol number (1) represents thunder and lightning.  
b) The symbol number (2) represents rainfall.  
c) The symbol number (3) represents cloud formation.  
d) The symbol number (4) represents sunny weather.



# كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9





حمل الآن

مجاناً وحصرياً

# المراجعة رقم (2)

## الترم الثاني



# 1 Write the scientific term:

## Unit 2

|     |                                                                                                                                                           |         |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1)  | A fixed point on which a rigid bar rests.                                                                                                                 | (.....) |
| 2)  | Levers where the fulcrum between effort and load.                                                                                                         | (.....) |
| 3)  | Levers where the effort is between the load and the fulcrum point.                                                                                        | (.....) |
| 4)  | Levers where the load is between the effort and the fulcrum point.                                                                                        | (.....) |
| 5)  | A means used by man to save time or effort or both while performing tasks.                                                                                | (.....) |
| 6)  | A rigid rod pivoted on a fulcrum and is acted upon by effort and load when used.                                                                          | (.....) |
| 7)  | The distance between the effort and the fulcrum.                                                                                                          | (.....) |
| 8)  | The distance between the load and the fulcrum.                                                                                                            | (.....) |
| 9)  | A law that explains the relation between effort and load at equilibrium of levers.                                                                        | (.....) |
| 10) | The ratio between the effort arm length to the load arm length.                                                                                           | (.....) |
| 11) | The male reproductive organ in the flower, consisting of several stamens.                                                                                 | (.....) |
| 12) | Specialized cells responsible for sexual reproduction in living organisms.                                                                                | (.....) |
| 13) | Reproduction that occurs by two parent individuals of the same species, one male and the other female.                                                    | (.....) |
| 14) | The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote carrying the full number of chromosomes (2n). | (.....) |
| 15) | The unit of structure and function in living organisms.                                                                                                   | (.....) |

unit 3



|     |                                                                                                                                                    |         |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 16) | A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction.   | (.....) |
| 17) | The male reproductive organ in the flower, consisting of several stamens.                                                                          | (.....) |
| 18) | The transfer of pollen grains from the anthers of one flower to the stigmas of another flower on a different plant of the same species.            | (.....) |
| 19) | A short stem whose leaves are modified to carry out reproduction in plants.                                                                        | (.....) |
| 20) | A cell formed by the fusion of the egg nucleus with the pollen nucleus and containing (2n) chromosomes.                                            | (.....) |
| 21) | They include all the cells of the living organism, except the reproductive cells.                                                                  | (.....) |
| 22) | The male and female reproductive organs responsible for production of reproductive cells.                                                          | (.....) |
| 23) | The cell division in which the somatic cell divides into two new diploid daughter cells identical to the parent cell.                              | (.....) |
| 24) | The cell division in which the cell divides into four haploid daughter cells, each daughter cell contains half the original number of chromosomes. | (.....) |
| 25) | A phenomenon that leads to the diversity of genetic traits among the individuals of the same species.                                              | (.....) |
| 26) | An abnormal cell growth formed when a somatic cell undergoes uncontrolled mitotic division repeatedly and abnormally.                              | (.....) |
| 27) | A vital process in which the parental individual produces new individuals that are completely identical in genetic traits.                         | (.....) |

|     |                                                                                                                                                                 |         |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 28) | The form of the asexual reproduction of the potato plant through its tubers.                                                                                    | (.....) |
| 29) | The stage that transforms by mitosis into an adult frog.                                                                                                        | (.....) |
| 30) | A cluster of flowers carried by the peduncle.                                                                                                                   | (.....) |
| 31) | The part of the stem that carries a cluster of flowers.                                                                                                         | (.....) |
| 32) | An inflorescence that resembles a cluster of grapes, in which the flowers bloom from bottom to top.                                                             | (.....) |
| 33) | A swollen part at the end of the flower pedicel that carries the floral whorls.                                                                                 | (.....) |
| 34) | The floral whorl whose function is to protect the inner parts of the flower, especially before blooming.                                                        | (.....) |
| 35) | The floral whorl whose function is attracting insects by its colour and fragrant.                                                                               | (.....) |
| 36) | A flower in which sepals and petals are absent.                                                                                                                 | (.....) |
| 37) | The floral whorl that consists of a group of carpels.                                                                                                           | (.....) |
| 38) | An inflammation caused by an immune response to harmless substances such as pollen grains.                                                                      | (.....) |
| 39) | The flower whose floral leaves are arranged in four floral whorls.                                                                                              | (.....) |
| 40) | The flower that contains both male and female organs together.                                                                                                  | (.....) |
| 41) | The flower that has either male organs only or female organs only.                                                                                              | (.....) |
| 42) | The process of the transfer of pollen grains from the anthers of the stamens to the stigmas of the carpels.                                                     | (.....) |
| 43) | The process of the transfer of pollen grains from the anther of a flower to the stigma in the same flower or to the stigma in another flower in the same plant. | (.....) |



|     |                                                                                                                        |         |
|-----|------------------------------------------------------------------------------------------------------------------------|---------|
| 44) | An opening through which the nucleus of the pollen grain reaches to the nucleus of the ovule.                          | (.....) |
| 45) | A stage in which the formation of the roots, stem and leaves begins in the life cycle of flowering plants.             | (.....) |
| 46) | Predicting future weather conditions in a certain place.                                                               | (.....) |
| 47) | A white wooden box with slanted openings that protects temperature-measuring instruments.                              | (.....) |
| 48) | A device is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere. | (.....) |
| 49) | Buoys used to collect data in oceans and transmit it via satellites.                                                   | (.....) |
| 50) | Satellites that rotate around the Earth to provide comprehensive weather images and data.                              | (.....) |
| 51) | Seasonal winds in Egypt carrying sand and dust and affecting health.                                                   | (.....) |
| 52) | A gas used in radiosonde balloons because of its light weight.                                                         | (.....) |
| 53) | The symbol used on maps to represent "thunder and lightning."                                                          | (.....) |
| 54) | The symbol used to represent "snowfall."                                                                               | (.....) |
| 55) | The altitude at which the radiosonde balloon bursts (in kilometers).                                                   | (.....) |
| 56) | The overall instantaneous condition of the atmosphere at certain place and time.                                       | (.....) |
| 57) | The atmospheric condition in a certain place over a long period of time.                                               | (.....) |
| 58) | The most important climatic element affecting the life of living organisms.                                            | (.....) |

|     |                                                                                                                                  |         |
|-----|----------------------------------------------------------------------------------------------------------------------------------|---------|
| 59) | The latitude $0^\circ$ that bisects the Earth into two halves, north and south.                                                  | (.....) |
| 60) | Latitude of $23.5^\circ\text{N}$                                                                                                 | (.....) |
| 61) | Latitude of $23.5^\circ\text{S}$                                                                                                 | (.....) |
| 62) | The thermal zone located between the tropic of Cancer and the tropic of Capricorn.                                               | (.....) |
| 63) | The thermal zone located between latitudes $66.5^\circ$ and $90^\circ$ north or south.                                           | (.....) |
| 64) | The movement of cool, refreshing air from the sea towards the land during the daytime.                                           | (.....) |
| 65) | The movement of cool, relatively dry air from the land towards the sea at night.                                                 | (.....) |
| 66) | The highest temperature in one day.                                                                                              | (.....) |
| 67) | The lowest temperature in one day.                                                                                               | (.....) |
| 68) | The difference between the maximum and minimum temperatures for one day.                                                         | (.....) |
| 69) | The arithmetic mean of the maximum and minimum temperatures for one day.                                                         | (.....) |
| 70) | The weight of a column of air with a cross-sectional area of $1\text{ m}^2$ and a height extending to the top of the atmosphere. | (.....) |
| 71) | A device used to measure atmospheric pressure.                                                                                   | (.....) |
| 72) | Atmospheric pressure at sea level.                                                                                               | (.....) |
| 73) | The amount of water vapour present in atmospheric air.                                                                           | (.....) |
| 74) | The actual mass of water vapour present in a certain volume of atmospheric air.                                                  | (.....) |
| 75) | The percentage of absolute humidity to the maximum capacity at the same temperature.                                             | (.....) |



|     |                                                                                                                |         |
|-----|----------------------------------------------------------------------------------------------------------------|---------|
| 76) | It is the horizontal movement of air across the Earth's surface, caused by difference in atmospheric pressure. | (.....) |
| 77) | The atmospheric pressure system at the two polar regions.                                                      | (.....) |
| 78) | The atmospheric pressure system at 60° latitudes at north and south.                                           | (.....) |
| 79) | The phenomenon of wind deflection in the Northern Hemisphere in a clockwise direction.                         | (.....) |
| 80) | A region where the atmospheric pressure value at its center is lower than that in the surrounding areas.       | (.....) |
| 81) | A region where the atmospheric pressure value at its center is higher than that in the surrounding areas.      | (.....) |
| 82) | They are curved lines connecting points of equal atmospheric pressure at sea level.                            | (.....) |
| 83) | The atmospheric pressure system at which clouds and rainfall are formed.                                       | (.....) |
| 84) | The atmospheric pressure system where the weather is clear and sunny.                                          | (.....) |
| 85) | It is the process of predicting the future weather conditions for a certain location.                          | (.....) |
| 86) | The technology used in oceans to collect weather data.                                                         | (.....) |
| 87) | The technology for collecting weather data that is launched into the air carried by a balloon.                 | (.....) |
| 88) | Stations for collecting and recording weather data.                                                            | (.....) |
| 89) | The distance between the load (resistance) and the fulcrum.                                                    | (.....) |

## 2 complete the following sentence:

## Unit 2

|     |                                                                                                                               |        |
|-----|-------------------------------------------------------------------------------------------------------------------------------|--------|
| 1)  | The effort arm is equal to the load arm in the ..... levers                                                                   |        |
| 2)  | If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to ..... cm. |        |
| 3)  | Levers make tasks easier by ..... , ..... and .....                                                                           |        |
| 4)  | The crowbar is a ..... class lever, while the manual broom is a ..... class lever                                             |        |
| 5)  | The lever is in a state of equilibrium when the moment of the effort and the moment of load are .....                         |        |
| 6)  | A machine saves effort when its mechanical advantage value is greater than .....                                              |        |
| 7)  | Increasing the length of the effort arm leads to .....                                                                        |        |
| 8)  | Second class levers are different from third class levers in .....                                                            |        |
| 9)  | Examples of levers that increase speed ..... / .....                                                                          |        |
| 10) | First class levers save effort when ..... is longer                                                                           | unit 3 |
| 11) | After fertilization, the ovary matures and becomes a fruit, while the ovules change into .....                                |        |
| 12) | The floral whorl that protects the internal parts of the flower before its blooming is the .....                              |        |
| 13) | Examples of unisexual flowers include the plant ..... and the plant .....                                                     | unit 4 |
| 14) | Winds are deflected to the right in the ..... Hemisphere.                                                                     |        |
| 15) | A low-pressure area is represented by the symbol .....                                                                        |        |
| 16) | Air moves from areas of ..... pressure to areas of ..... pressure.                                                            |        |



- |     |                                                                                            |
|-----|--------------------------------------------------------------------------------------------|
| 17) | The deflection of winds caused by Earth's rotation is called the ..... effect.             |
| 18) | At the equator, wind paths are .....                                                       |
| 19) | Air currents in a low-pressure area are ..... / ..... , leading to cloud formation.        |
| 20) | Air currents in a high-pressure area are ..... / ..... , leading to dry and clear weather. |

### 3 give reason for the following

### Unit 2

- 1) Second class levers always save effort  
.....
- 2) Simple machines are very important in our lives.  
.....
- 3) The effort and load can be equal to the first type of levers only.  
.....
- 4) Third class levers do not always save effort.  
.....
- 5) Fixed pulley is a type of first-class lever.  
.....
- 6) Effort and load can be equal only in first-class Levers.  
.....

- 
- 7) Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals.

### unit 3

- 8) The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity.



9) Petals in many flowers are brightly colored and have a Fragrant scent.

10) Anthers hang outside the flowers of some plants that are pollinated by wind.

11) Pollen grains in insect-pollinated plants are sticky or rough.

12) The importance of the floral envelope in flowers such as the Narcissus flower.

13) Wind-pollinated plants produce pollen grains in very large numbers.

14) The variety of weather and climate elements.

unit 4

15) The existence of different thermal zones on the Earth's surface.

16) The occurrence of sea breeze.

17) The difference in the daily temperature range from one city to another.

18) The variation of atmospheric pressure from one region to another.

19) The effect of humidity on atmospheric pressure.

20) The decrease in temperature with increasing distance away from the Equator.



21) Temperature is considered the most important climatic element.

22) Areas close to the Equator are characterized by high temperatures.

23) The occurrence of land breeze.

24) Temperature decreases as we rise above sea level.

25) The daily average temperature differs from one city to another.

26) Atmospheric pressure decreases with increasing altitude above sea level.

27) Temperature affects atmospheric pressure.

28) Temperature is affected by differences in lines of latitude.

29) Temperature is affected near water bodies.

30) The rate of influenza spread increases in winter.

31) The Stevenson screen is painted with white color.

32) The radiosonde balloon bursts when it reaches high altitudes.

33) The Stevenson screen is placed away from trees and buildings.

34) Weather forecasts are not absolute facts.



35) The importance of satellites in meteorology.

36) The Stevenson screen is raised 120 cm above ground level.

37) The presence of slanted openings in the walls of The Stevenson screen.

38) The radiosonde balloon is filled with helium or hydrogen gas.

39) Khamaseen winds have harmful health effects.

40) The accuracy of weather forecasts decreases as the time period increases.

## 4 what happen if

## Unit 2

1) The levers were not detected.

2) If the effort arm is longer than the load arm in the levers.

3) Anthers and stigmas do not mature at the same time?

unit 3

4) A pollen grain falls on the stigma of a flower of a different species?

5) The gynoecium is removed from a typical flower before it blooms?

6) Increase both of the maximum and minimum temperatures?

7) We move higher above sea level?



8) The specific heat of water differs from that of land at night?

.....

9) We move closer to or farther away from the Equator?

unit 4

.....

10) Humidity increases (with respect to pressure)?

.....

11) Temperature increases (with respect to pressure)?

.....

12) The Earth stopped rotating?

.....

13) Meteorological satellites disappeared?

.....

Atmospheric pressure became equal between two cities?

.....

## 5 Answer the following

## Unit 2

1) Mention the importance of each of the following:

1. lever : .....

2. Tweezers : .....

3. Crowbar : .....

4. Forceps: .....

2) Problem:

1-A type of first class lever had a force of 40 N and a effort arm of 5 cm. It affected a load of 100 N.

Calculate the length of the load arm? Does the lever save effort or not?

.....

.....

.....



- 3) Imagine trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum.

1 - What type of levers will be used?

.....

2 - Will you choose a long or short column to get the job done?

.....

3 - Where will you put the small stone in relation to the huge rock?

.....

- 4) A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.
- .....

1 -Is this lever balanced? and why?

.....

2 - If the lever is unbalanced, what is the length of the load arm that achieves balance?

.....

- 5) Using the following table, find the value of x, y and state the law of levers.

| Effort (Newton) | Effort Arm (cm) | Load (Newton) | Load Arm (cm) |
|-----------------|-----------------|---------------|---------------|
| x               | 5               | 1             | 10            |
| 4               | 5               | 2             | y             |

.....

.....

- 6) The weight of a wheelbarrow carrying sand is 900 N. If the distance from the wheel (fulcrum) to the center of gravity of wheelbarrow (load) is 0.4 m, and from the wheel to the hand position on the handle (Effort) is 1.2 m:

(1) What is the lever type? Explain your answer.

.....



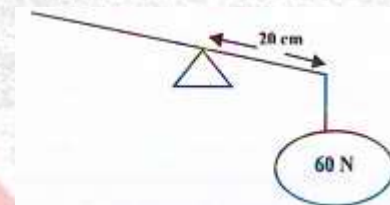
2) Does the wheelbarrow save effort? Justify your answer mathematically

.....

7) In the corresponding figure:

On what dimension of the fulcrum does  
a load of 30 N is hanged, to balance the lever?

.....



8) A lever is acted upon by an effort of 30 N with an effort arm of 20 cm, and a load of 20 N with a load arm of 10 cm.

1. Is the lever in equilibrium? Why?
  2. If the lever is not in equilibrium, what should be the length of the load arm to achieve equilibrium.
- .....

9) Pollination and Fertilization in Flowers

unit 3

Based on your study of the types of pollination, determine the type of pollination in each of the following cases:

1. The androecium and gynoecium mature at the same time.
  2. The anthers are far from the stigmas or are at a higher level than them.
  3. All flowers are unisexual.
  4. Flowers remain closed and do not bloom until pollination.
- .....

10) Choose the odd word out, then state the relationship between the remaining ones:

- Zucchini - Date palm - Tomato – Maize
- .....



- Stigma - Style - Ovary – Filament

Self-pollination and cross-pollination (definition and method).

Self: .....

Cross: .....

11) Mention the importance of each of the following:

1. Mitosis in humans: .....

2. Meiosis in humans: .....

12) Based on your study of the structure of the typical flower, complete the following table:

| Floral whorl | Main function | Name of the leaf forming it |
|--------------|---------------|-----------------------------|
| Calyx        | .....         | .....                       |
| Corolla      | .....         | .....                       |
| Androecium   | .....         | .....                       |
| Gynoecium    | .....         | .....                       |

13) What is the importance (benefit) of each of the following:

unit 4

1) The difference in atmospheric pressure between two regions.

.....

2) Knowing the direction of the Coriolis effect.

.....

3) Weather maps.

.....

4) The white color of the Stevenson screen

.....

5) The slanted openings in the Stevenson screen.

.....

6) Placing the Weather Kiosk away from trees and buildings.

.....



7) The radiosonde balloon.

.....

8) Meteorological satellites.

.....

9) The parachute in the radiosonde.

.....

10) Weather Forecast Icons (Symbols)

.....

6

**Mark (✓) or (x), with correction :**

Unit 3

|     |                                                                                                             |     |
|-----|-------------------------------------------------------------------------------------------------------------|-----|
| 1)  | Gametes contain a diploid number of chromosomes (2n).                                                       | ( ) |
| 2)  | Asexual reproduction takes place by mitosis.                                                                | ( ) |
| 3)  | Cancerous tumors result from repeated abnormal meiotic divisions.                                           | ( ) |
| 4)  | Crossing-over phenomenon between chromosomes contributes to genetic diversity among individuals.            | ( ) |
| 5)  | Winds move in completely straight paths from the poles to the equator.                                      | ( ) |
| 6)  | Wind speed increases when the difference in atmospheric pressure is large.                                  | ( ) |
| 7)  | In the Northern Hemisphere, winds rotate around the center of a low-pressure system anticlockwise direction | ( ) |
| 8)  | Cold, moist air in polar regions forms a high-pressure area.                                                | ( ) |
| 9)  | The Coriolis effect is responsible for winds moving in curved paths.                                        | ( ) |
| 10) | Lines of equal pressure are called isobars.                                                                 | ( ) |
| 11) | At the center of a low-pressure system, pressure values are higher than in surrounding areas.               | ( ) |

unit 4

7

**Choose the correct answer:**

Unit 2

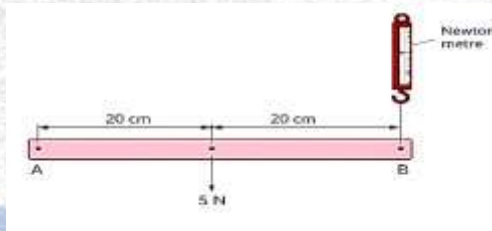
1) When the lever is at equilibrium.....

- a) Effort x load arm = load x Effort arm
- b) Moment of effort > Moment of load
- c) Effort x its arm > load x its arm
- d) Moment of effort = Moment of load



- 2) Ice tongs.....
- have a mechanical advantage equal to 1
  - are a third-class lever.
  - have a mechanical advantage greater than 1
  - are a second-class lever.

- 3) A metal rod AB of weight 5 N is able to rotate around point A



What is the reading of the Newton meter when the rod is balanced horizontally?

- 2.5N
- 5N
- 8N
- 10 N

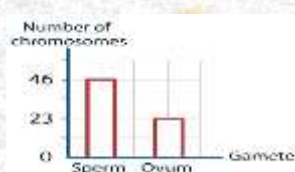
- 4) The cells of parts illustrated in the opposite figure contain the same number of

unit 3

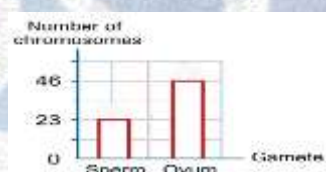
- ATP molecules.
- gametes.
- chromosomes (2n).
- chromosomes (n).



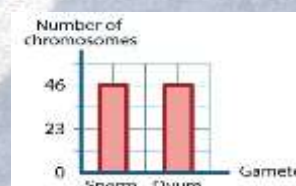
- 5) Which of the following represents the number of chromosomes found in human gametes?



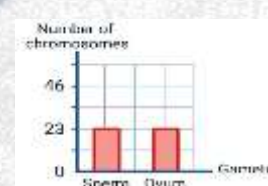
(a)



(b)



(c)



(d)

- 6) The opposite figure illustrates the life cycle of a flowering plant: Which of the following describes both processes Choose x and (Y)?



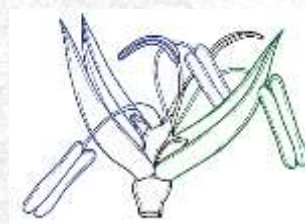
- (x): Germination and fertiization ,(Y) Pollinasion.
- (x): Pollination and fertillization . ,(Y) Germination.
- (x): Pollination ,(Y): Fertilization and germination
- (x): Fertilization. ,(Y) Pollination and germination.



7) The composite figure illustrates the structure of a flower.

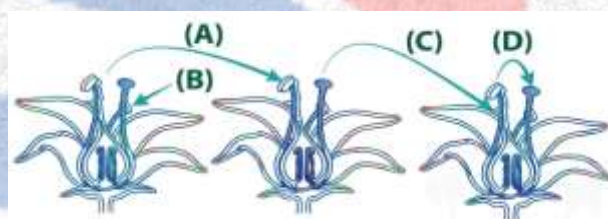
Which of the following describes this flower?

- a) Bisexual, insect-pollinated
- b) Unisexual, wind-pollinated
- c) Unisexual, insect-pollinated
- d) Bisexual, wind-pollinated



8) From the opposite figure Which letter indicates cross-pollination?

- a) (A)
- b) (B)
- c) (C)
- d) (D)



9) Which statement correctly describes the petunia flower?

- a) Its petals are arranged in a single whorl.
- b) Its petals are green in colour.
- c) Its sepals are separate.
- d) The number of its sepals is double the number of its petals

10) What occurs immediately after fertilization in sexual reproduction?

- a) A zygote with a tetraploid chromosome number ( $4n$ ) is formed.
- b) The zygote begins to divide mitotically.
- c) The zygote undergoes meiotic division.
- d) A zygote with a haploid chromosome number ( $n$ ) is formed.

11) Winds arise as a result of differences in ..... between Neighboring areas

- a) temperature
- b) atmospheric pressure
- c) humidity



12) Air always moves from areas of ... pressure to areas of ..... pressure.

a) high/low

b) low/high

c) low/low

---

13) The rotation of the Earth around its axis causes the deflection of winds, known as.....

a) greenhouse effect

b) Coriolis effect

c) atmospheric pressure

---

14) Winds are deflected in the Northern Hemisphere to the ..... of their original direction.

a) right

b) left

c) east

---

15) Winds are deflected in the Southern Hemisphere ..... the clockwise direction

a) with

b) against

c) parallel to

---

16) Wind deflection is greatest at the.....

a) equator

b) poles

c) tropics

---

17) A high atmospheric pressure area is represented by the symbol .....

a) L

b) H

c) P

---

18) On weather maps, the lines that connect points of equal pressure are called .....

a) isobars

b) lines of longitude

c) elevations

---

19) A low-pressure area is represented by the color

a) blue

b) red

c) yellow

---

20) A low-pressure area (L) forms at the .....

a) poles

b) equator

c) cold regions

---

21) Weather forecasts help farmers determine the times of.....

a) irrigation

b) harvesting

c) both of them

---



22) One of the safety measures during Khamaseen winds is.....

- a) wearing a mask                      b) traveling by sea                      c) irrigating crops
- 

23) A weather forecast for ... is more accurate than a one-week forecast.

- a) two days                      b) a month                      c) a year
- 

24) Weather forecast aim in protection of lives from ..

- a) earthquakes                      b) thunderstorms                      c) volcanoes
- 

25) Aircraft navigation mainly depends on knowing

- a) weather maps                      b) ocean depths                      c) forests
- 

26) The most important climatic element is .....

- a) temperature.                      b) atmospheric pressure.  
c) humidity                      d) wind
- 

27) Normal atmospheric pressure equals

- a) 1013.25 mm Hg                      b) 700 mb  
c) 1013.25 mb                      d) 760 cm.Hg
- 

28) Which of the following is correct?

- a) Temperatures are equal at latitude 30' North and latitude 0"  
b) Temperatures are equal at latitude 30" South and the Equator.  
c) Temperature at latitude 60" North is higher than at latitude 0" in winter.  
d) Temperature at latitude 60" North is lower than at the Equator in winter
- 

29) Which of the following expresses Coriolis Effect?

- a) Its effect reaches its maximum at the Equator.  
b) it causes wind to be deflected to the left in the Southern Hemisphere.  
c) It does not cause wind deflection in the Northern Hemisphere.  
d) Its effect becomes clear when atmospheric pressure values differ.
-



30) Air currents in a low-pressure system rotate.....

- a) in a clockwise direction, outward away from the system.
- b) in a clockwise direction, inward toward the center of the system.
- c) in an anticlockwise direction, outward away from the center of the system.
- d) in an anticlockwise direction, inward toward the center of the system.

31) Radiosonde sensors collect weather data while they are in.....

- a) the atmosphere.
- b) the oceans.
- c) weather station shelters
- d) weather stations

## 8 what is meant by

## Unit 2

|                               |       |
|-------------------------------|-------|
| Simple Machine                | ..... |
| Lever                         | ..... |
| Fulcrum                       | ..... |
| Effort arm                    | ..... |
| Load arm                      | ..... |
| The Law of Levers             | ..... |
| Moment of effort              | ..... |
| Moment of load                | ..... |
| Mechanical advantage of lever | ..... |
| Somatic cells                 | ..... |
| Asexual reproduction          | ..... |
| Reproductive cells            | ..... |
| Mitosis                       | ..... |
| Meiosis                       | ..... |
| Genetic crossing over         | ..... |

unit 3



|                           |       |
|---------------------------|-------|
| Flower                    | ..... |
| Typical flower            | ..... |
| Floral envelope           | ..... |
| Androecium                | ..... |
| Gynoecium                 | ..... |
| Bisexual flower           | ..... |
| Unisexual flower          | ..... |
| Pollination               | ..... |
| Fertilization             | ..... |
| Weather                   | ..... |
| Climate                   | ..... |
| Maximum temperature       | ..... |
| Minimum temperature       | ..... |
| Daily average temperature | ..... |
| Daily temperature range   | ..... |
| Atmospheric pressure      | ..... |
| Humidity                  | ..... |
| Absolute humidity         | ..... |
| Relative humidity         | ..... |
| Winds:                    | ..... |
| Coriolis effect:          | ..... |
| Isobars:                  | ..... |
| Low-pressure system (L):  | ..... |

unit 4

|                                           |       |
|-------------------------------------------|-------|
| The Weather Kiosk<br>(Stevenson's Kiosk): | ..... |
| Weather forecasting:                      | ..... |
| Radiosonde:                               | ..... |
| Meteorological<br>buoys:                  | ..... |
| High-pressure<br>system:                  | ..... |
| Khamaseen winds:                          | ..... |

## 9 compare between eqch of the following

## Unit 2

- 1) The first, second and third class of levers in terms of: (definition - mentioning an example of each type - saving effort ).

- 2) a) Somatic cells and reproductive (germ) cells.

## Unit 3

- b) Sexual reproduction and asexual reproduction.

- 3) Pollination and Fertilization in Flowers

Means of Pollen Grain Transfer

- 4) Compare between self-pollination and cross-pollination  
(in terms of definition and how each occurs)

- 5) Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.

1. Bisexual flowers and unisexual flowers.

2. Androecium and gynoecium in terms of structure and function.

## Unit 4

- 6) Weather and Climate.

- 7) Daily average temperature and daily temperature range.

- 8) Compare between land breeze and sea breeze

(Two points only).



**10** correct the following statement**Unit 2**

1) Soda water opener is a type first class lever

(.....).

2) One of the functions of the levers is to reduce the effort as in manual broom.

(.....).

3) The first type of levers differ from the second type of levers in the presence of an effective effort.

(.....).

4) Gamete cells contain the full number of chromosomes found in somatic cells.

(.....).

Mitosis is known as reduction division.

(.....).

5) Asexual reproduction depends on meiosis.

(.....)

6) The first meiotic division is a mitotic division.

(.....)

7) Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals.

(.....)

8) after the second meiotic division, two cells are produced containing half the original number of chromosomes (n).

(.....)

9) A bottle opener is a first-class lever.

(.....)

10) One function of levers is decreasing force as in the hand broom.

(.....)

11) First-class levers differ from second-class levers in the presence of an applied force.

(.....)

12) A fishing rod is a second-class lever.

(.....)

13) Vegetative reproduction is a form of sexual reproduction.

(.....)

**Unit 3****Unit 4**



# 12 various questions

## Unit 2

1) The following figures represents a lever from

|                                                                                   |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |
| ..... type                                                                        | ..... type                                                                        | ..... type                                                                          |
| 1. Head/Neck: .....                                                               | 2. Arm:.....                                                                      | 3. Foot/Leg: .....                                                                  |
| .....                                                                             | .....                                                                             | .....                                                                               |

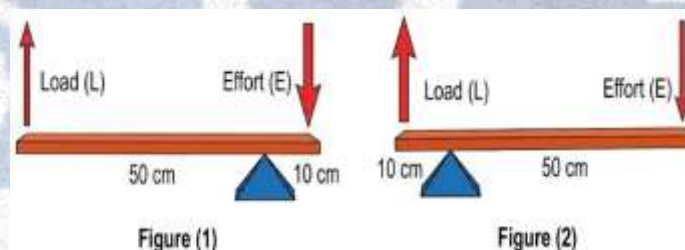
2) From the two figures



Which figure represents a better way to lift the rock? Explain your answer.

What can be done to increase the mechanical advantage of this lever?

3) The following two figures represent a type of levers:

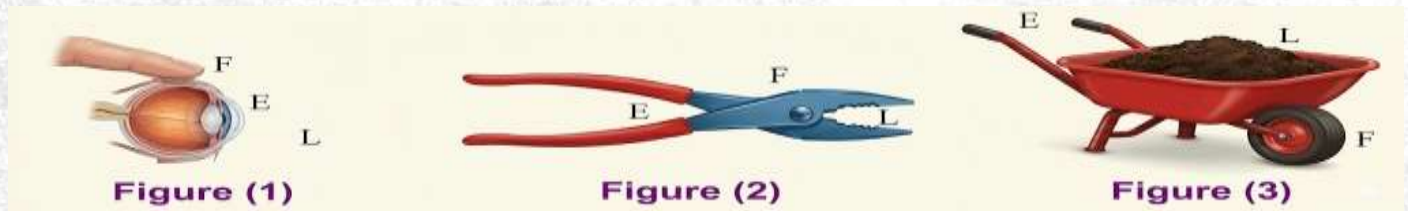


(1) What type of lever is this? Explain your answer.

(2) Which figure represents the lever when it has a greater mechanical advantage? Find its value.



4) Classify the levers shown in the figures below in terms of their types:



5) Look at the following figure, then complete the data:

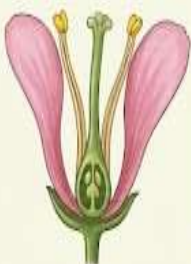
|                        |                                                       |                            |
|------------------------|-------------------------------------------------------|----------------------------|
|                        |                                                       |                            |
| Homologous chromosomes | Non-sister .....<br>.....<br>twist around one another | Exchange of .....<br>..... |
| <p>..... Phenomena</p> |                                                       |                            |

6) Study the figures in front of you, then identify the name of the plant and state the difference between them in terms of (petals and sepals).

|                   |        |        |  |
|-------------------|--------|--------|--|
|                   |        |        |  |
| (2)               |        | (1)    |  |
| Name of the plant | Sepals | Petals |  |
| .....             | .....  | .....  |  |
| .....             | .....  | .....  |  |

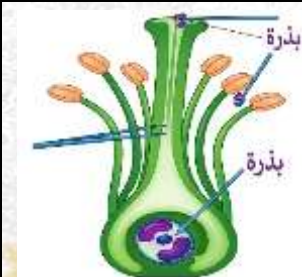
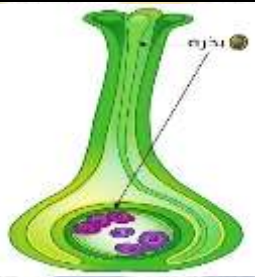


- 7) Observe the following flowers, then determine the sex of each flower and explain the reason:

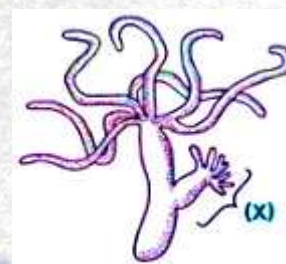
|                                                                                  |                      |                                                                                   |                      |                                                                                     |                      |
|----------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|----------------------|
|  | The flower:<br>..... |  | The flower:<br>..... |  | The flower:<br>..... |
| The flower: .....<br>Reason: .....<br>.....<br>.....                             |                      | The flower: .....<br>Reason: .....<br>.....<br>.....                              |                      | The flower: .....<br>Reason: .....<br>.....<br>.....                                |                      |

## 8) Fertilization

Determine the steps of fertilization and fruit formation:

|                                                                                   |                                                                                    |                                                                                     |                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |  |
| .....<br>.....<br>.....                                                           | .....<br>.....<br>.....                                                            | .....<br>.....<br>.....                                                             | .....<br>.....<br>.....                                                              |

- 9) The figure shows the reproduction of a living organism produced by a single parent:



- (1) Is the number of chromosomes in the cells of part (X) resulting from the reproduction process equal to (n) or (2n)?

.....

- (2) What is the type of this reproduction?

.....

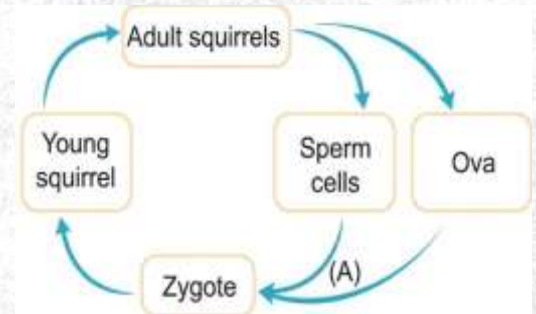
- (3) Does this reproduction occur through meiosis or mitosis?

.....



10) The diagram shows the reproduction cycle of the squirrel in which the zygote contains 40 chromosomes :

(1) What is the name of process (A)?

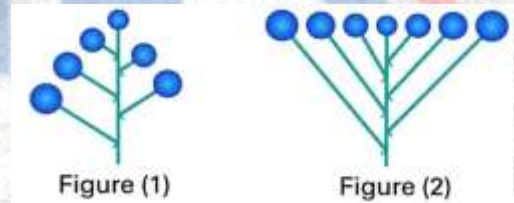


(2) What is the number of chromosomes in each cell of:

1- Young squirrel.

2- The ova.

11) In front of you are two examples of inflorescences you have studied  
Compare between them in terms of:



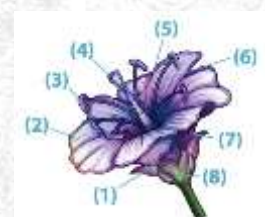
(1) Type of inflorescence.

(2) Length of the peduncle.

(3) Reason for naming.

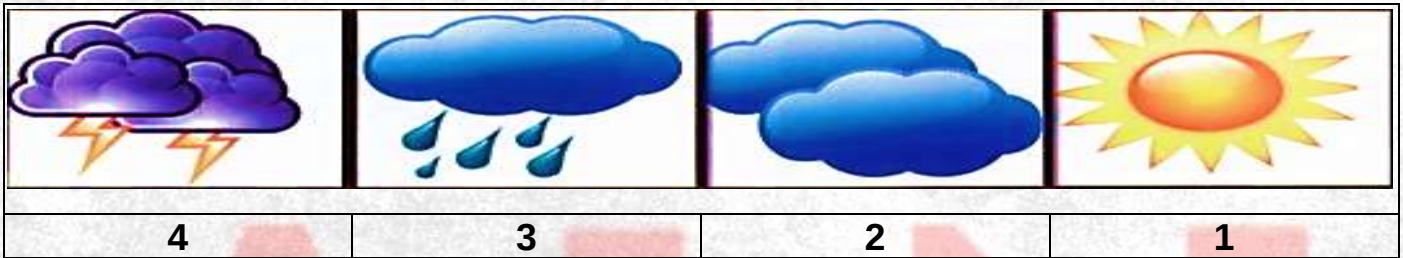
|                                 | Shape (1)                                          | Shape (2)                                          |
|---------------------------------|----------------------------------------------------|----------------------------------------------------|
| (1)<br>Type of<br>inflorescence | .....<br>.....<br>.....                            | .....<br>.....<br>.....                            |
| (2)<br>Peduncle length          | .....                                              | .....                                              |
| (3)<br>Reason for<br>naming     | .....<br>.....<br>.....<br>.....<br>.....<br>..... | .....<br>.....<br>.....<br>.....<br>.....<br>..... |

12) Replace the numbers shown in the opposite figure  
bers shown with the appropriate labels.





13) Identify the symbols:



- 1) The symbol that represents a thunderstorm is .....
- 2) The symbol that represents sunny weather is .....
- 3) What does symbol (3) indicate on weather maps?

14) The following figure represents one of the natural phenomena

(1) What is the name of this phenomenon?

Does it occur during the day or at night?

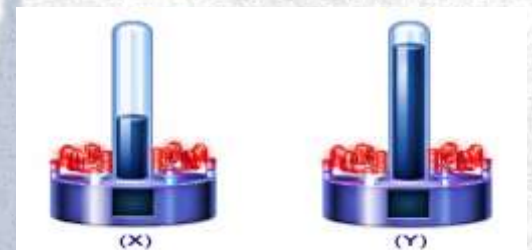


(2) According to what you have studied. mention. What is the cause of this phenomenon?

15) The opposite figure shows a device placed at the base of a mountain once and at its peak

another time.

(1) What is the name of this device and what is it used for?



2) Identify which figure, (X) or (Y). represents the device when it is at the peak of the mountain. Explain your answer

16) What does each of the numbers shown on the following map indicate?





# 1 Write the scientific term:

## Unit 2

|     |                                                                                                                                                           |                        |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1)  | A fixed point on which a rigid bar rests.                                                                                                                 | (Fulcrum)              |
| 2)  | Levers where the fulcrum between effort and load.                                                                                                         | (First-class levers)   |
| 3)  | Levers where the effort is between the load and the fulcrum point.                                                                                        | (Third-class levers)   |
| 4)  | Levers where the load is between the effort and the fulcrum point.                                                                                        | (Second-class levers)  |
| 5)  | A means used by man to save time or effort or both while performing tasks.                                                                                | The machine.           |
| 6)  | A rigid rod pivoted on a fulcrum and is acted upon by effort and load when used.                                                                          | Levers.                |
| 7)  | The distance between the effort and the fulcrum.                                                                                                          | Effort arm.            |
| 8)  | The distance between the load and the fulcrum.                                                                                                            | Load arm.              |
| 9)  | A law that explains the relation between effort and load at equilibrium of levers.                                                                        | Law of levers.         |
| 10) | The ratio between the effort arm length to the load arm length.                                                                                           | Mechanical advantage.  |
| 11) | The male reproductive organ in the flower, consisting of several stamens.                                                                                 | (Anthers)              |
| 12) | Specialized cells responsible for sexual reproduction in living organisms.                                                                                | (Gametes (Sperm/Ovum)) |
| 13) | Reproduction that occurs by two parent individuals of the same species, one male and the other female.                                                    | (Sexual reproduction)  |
| 14) | The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote carrying the full number of chromosomes (2n). | (Fertilization)        |
| 15) | The unit of structure and function in living organisms.                                                                                                   | (The Cell)             |
| 16) | A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction.          | (Reproduction)         |
| 17) | The male reproductive organ in the flower, consisting of several stamens.                                                                                 | (Androecium (Stamens)) |
| 18) | The transfer of pollen grains from the anthers of one flower to the stigmas of another flower on a different plant of the same species.                   | (Cross-pollination)    |

unit 3



|     |                                                                                                                                                    |                              |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 19) | A short stem whose leaves are modified to carry out reproduction in plants.                                                                        | (Flower)                     |
| 20) | A cell formed by the fusion of the egg nucleus with the pollen nucleus and containing (2n) chromosomes.                                            | (Zygote)                     |
| 21) | They include all the cells of the living organism, except the reproductive cells.                                                                  | Somatic cells.               |
| 22) | The male and female reproductive organs responsible for production of reproductive cells.                                                          | Gonads.                      |
| 23) | The cell division in which the somatic cell divides into two new diploid daughter cells identical to the parent cell.                              | Mitosis.                     |
| 24) | The cell division in which the cell divides into four haploid daughter cells, each daughter cell contains half the original number of chromosomes. | Meiosis.                     |
| 25) | A phenomenon that leads to the diversity of genetic traits among the individuals of the same species.                                              | Crossing-over phenomenon.    |
| 26) | An abnormal cell growth formed when a somatic cell undergoes uncontrolled mitotic division repeatedly and abnormally.                              | Cancerous tumor.             |
| 27) | A vital process in which the parental individual produces new individuals that are completely identical in genetic traits.                         | Asexual reproduction.        |
| 28) | The form of the asexual reproduction of the potato plant through its tubers.                                                                       | Vegetative reproduction.     |
| 29) | The stage that transforms by mitosis into an adult frog.                                                                                           | Tadpole stage.               |
| 30) | A cluster of flowers carried by the peduncle.                                                                                                      | Inflorescence.               |
| 31) | The part of the stem that carries a cluster of flowers.                                                                                            | Peduncle.                    |
| 32) | An inflorescence that resembles a cluster of grapes, in which the flowers bloom from bottom to top.                                                | Simple raceme inflorescence. |
| 33) | A swollen part at the end of the flower pedicel that carries the floral whorls.                                                                    | Receptacle.                  |
| 34) | The floral whorl whose function is to protect the inner parts of the flower, especially before blooming.                                           | Calyx.                       |

|     |                                                                                                                                                                 |                                                 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 35) | The floral whorl whose function is attracting insects by its colour and fragrant.                                                                               | Corolla.                                        |
| 36) | A flower in which sepals and petals are absent.                                                                                                                 | Naked flower                                    |
| 37) | The floral whorl that consists of a group of carpels.                                                                                                           | Pistil.                                         |
| 38) | An inflammation caused by an immune response to harmless substances such as pollen grains.                                                                      | Hay fever.                                      |
| 39) | The flower whose floral leaves are arranged in four floral whorls.                                                                                              | Typical flower.                                 |
| 40) | The flower that contains both male and female organs together.                                                                                                  | Bisexual flower.                                |
| 41) | The flower that has either male organs only or female organs only.                                                                                              | Unisexual flower.                               |
| 42) | The process of the transfer of pollen grains from the anthers of the stamens to the stigmas of the carpels.                                                     | Pollination.                                    |
| 43) | The process of the transfer of pollen grains from the anther of a flower to the stigma in the same flower or to the stigma in another flower in the same plant. | Self-pollination.                               |
| 44) | An opening through which the nucleus of the pollen grain reaches to the nucleus of the ovule.                                                                   | Micropyle opening.                              |
| 45) | A stage in which the formation of the roots, stem and leaves begins in the life cycle of flowering plants.                                                      | Vegetative growth.                              |
| 46) | Predicting future weather conditions in a certain place.                                                                                                        | ( Weather forecasting)                          |
| 47) | A white wooden box with slanted openings that protects temperature-measuring instruments.                                                                       | (Stevenson screen<br>(Weather station shelter)) |
| 48) | A device is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere.                                          | ( Radiosonde)                                   |
| 49) | Buoys used to collect data in oceans and transmit it via satellites.                                                                                            | (Meteorological buoys)                          |
| 50) | Satellites that rotate around the Earth to provide comprehensive weather images and data.                                                                       | ( Meteorological satellites)                    |
| 51) | Seasonal winds in Egypt carrying sand and dust and affecting health.                                                                                            | (Khamaseen winds)                               |



|     |                                                                                                                                  |                                                |
|-----|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| 52) | A gas used in radiosonde balloons because of its light weight.                                                                   | (Hydrogen or Helium gas)                       |
| 53) | The symbol used on maps to represent "thunder and lightning."                                                                    | (Thunderstorm symbol (often a lightning bolt)) |
| 54) | The symbol used to represent "snowfall."                                                                                         | ( Snowfall symbol (snowflake))                 |
| 55) | The altitude at which the radiosonde balloon bursts (in kilometers).                                                             | ( Bursting altitude (approximately 30–40 km))  |
| 56) | The overall instantaneous condition of the atmosphere at certain place and time.                                                 | Weather.                                       |
| 57) | The atmospheric condition in a certain place over a long period of time.                                                         | Climate.                                       |
| 58) | The most important climatic element affecting the life of living organisms.                                                      | Temperature.                                   |
| 59) | The latitude $0^{\circ}$ that bisects the Earth into two halves, north and south.                                                | The Equator.                                   |
| 60) | Latitude of $23.5^{\circ}\text{N}$                                                                                               | Tropic of Cancer.                              |
| 61) | Latitude of $23.5^{\circ}\text{S}$                                                                                               | Tropic of Capricorn.                           |
| 62) | The thermal zone located between the tropic of Cancer and the tropic of Capricorn.                                               | The hot zone (tropical).                       |
| 63) | The thermal zone located between latitudes $66.5^{\circ}$ – $90^{\circ}$ north or south.                                         | The cold zone (polar).                         |
| 64) | The movement of cool, refreshing air from the sea towards the land during the daytime.                                           | Sea breeze.                                    |
| 65) | The movement of cool, relatively dry air from the land towards the sea at night.                                                 | Land breeze.                                   |
| 66) | The highest temperature in one day.                                                                                              | Maximum temperature.                           |
| 67) | The lowest temperature in one day.                                                                                               | Minimum temperature.                           |
| 68) | The difference between the maximum and minimum temperatures for one day.                                                         | Daily temperature range.                       |
| 69) | The arithmetic mean of the maximum and minimum temperatures for one day.                                                         | Daily average temperature.                     |
| 70) | The weight of a column of air with a cross-sectional area of $1\text{ m}^2$ and a height extending to the top of the atmosphere. | Atmospheric pressure.                          |
| 71) | A device used to measure atmospheric pressure.                                                                                   | Mercury barometer.                             |
| 72) | Atmospheric pressure at sea level.                                                                                               | Normal atmospheric pressure.                   |



|     |                                                                                                                |                                    |
|-----|----------------------------------------------------------------------------------------------------------------|------------------------------------|
| 73) | The amount of water vapour present in atmospheric air.                                                         | Humidity.                          |
| 74) | The actual mass of water vapour present in a certain volume of atmospheric air.                                | Absolute humidity.                 |
| 75) | The percentage of absolute humidity to the maximum capacity at the same temperature.                           | Relative humidity.                 |
| 76) | It is the horizontal movement of air across the Earth's surface, caused by difference in atmospheric pressure. | Wind.                              |
| 77) | The atmospheric pressure system at the two polar regions.                                                      | High atmospheric pressure.         |
| 78) | The atmospheric pressure system at 60° latitudes at north and south.                                           | Low atmospheric pressure.          |
| 79) | The phenomenon of wind deflection in the Northern Hemisphere in a clockwise direction.                         | Coriolis Effect.                   |
| 80) | A region where the atmospheric pressure value at its center is lower than that in the surrounding areas.       | Low pressure system.               |
| 81) | A region where the atmospheric pressure value at its center is higher than that in the surrounding areas.      | High pressure system.              |
| 82) | They are curved lines connecting points of equal atmospheric pressure at sea level.                            | Isobars (lines of equal pressure). |
| 83) | The atmospheric pressure system at which clouds and rainfall are formed.                                       | Low atmospheric pressure regions.  |
| 84) | The atmospheric pressure system where the weather is clear and sunny.                                          | High atmospheric pressure regions. |
| 85) | It is the process of predicting the future weather conditions for a certain location.                          | Weather forecasting.               |
| 86) | The technology used in oceans to collect weather data.                                                         | Weather buoys.                     |
| 87) | The technology for collecting weather data that is launched into the air carried by a balloon.                 | Radiosonde (radio probe).          |
| 88) | Stations for collecting and recording weather data.                                                            | Weather stations.                  |
| 89) | The distance between the load (resistance) and the fulcrum.                                                    | (Arm of resistance)                |



## 2 complete the following sentence:

## Unit 2

|     |                                                                                                                                                                                                            |        |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1)  | The effort arm is equal to the load arm in the <b>First class</b> levers                                                                                                                                   |        |
| 2)  | If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to <b>100 cm</b> (Since $F \times 0.5 = R$ , and arms must <b>balance the ratio</b> ) cm. |        |
| 3)  | Levers make tasks easier by <b>Increasing force</b> , <b>Increasing distance</b> and <b>Increasing speed</b>                                                                                               |        |
| 4)  | The crowbar is a <b>First</b> class lever, while the manual broom is a <b>Third</b> class lever                                                                                                            |        |
| 5)  | The lever is in a state of equilibrium when the moment of the effort and the moment of load are <b>Equal</b>                                                                                               |        |
| 6)  | A machine saves effort when its mechanical advantage value is greater than <b>One (1)</b> .                                                                                                                |        |
| 7)  | Increasing the length of the effort arm leads to <b>Saving effort (Decreasing the effort needed)</b> .                                                                                                     |        |
| 8)  | Second class levers are different from third class levers in <b>The position of the load and effort (or "saving effort")</b> .                                                                             |        |
| 9)  | Examples of levers that increase speed <b>Manual broom / Hockey bat</b> .                                                                                                                                  |        |
| 10) | First class levers save effort when <b>Effort arm</b> is longer                                                                                                                                            |        |
| 11) | After fertilization, the ovary matures and becomes a fruit, while the ovules change into <b>seeds</b> .                                                                                                    | unit 3 |
| 12) | The floral whorl that protects the internal parts of the flower before its blooming is the <b>Calyx (Sepals)</b> .                                                                                         |        |
| 13) | Examples of unisexual flowers include the plant <b>Maize (Corn)</b> and the plant <b>Palm (or Zucchini)</b> .                                                                                              | unit 4 |
| 14) | Winds are deflected to the right in the <b>Northern</b> Hemisphere.                                                                                                                                        |        |
| 15) | A low-pressure area is represented by the symbol <b>L in red colour</b>                                                                                                                                    |        |
| 16) | Air moves from areas of <b>High</b> pressure to areas of <b>Low</b> pressure.                                                                                                                              |        |
| 17) | The deflection of winds caused by Earth's rotation is called the <b>Coriolis</b> effect.                                                                                                                   |        |
| 18) | At the equator, wind paths are <b>straight</b>                                                                                                                                                             |        |
| 19) | Air currents in a low-pressure area are <b>Rising / Ascending</b> , leading to cloud formation.                                                                                                            |        |
| 20) | Air currents in a high-pressure area are <b>Descending / Falling</b> , leading to dry and clear weather.                                                                                                   |        |



**3** give reason for the following**Unit 2**

- 1) Second class levers always save effort

Because the effort arm is always longer than the load arm.

- 2) Simple machines are very important in our lives.

They help us perform hard tasks with less effort or more precision.

- 3) The effort and load can be equal to the first type of levers only.

Because the fulcrum is in the middle, allowing the arms to be equal

- 4) Third class levers do not always save effort.

Because the effort arm is shorter than the load arm.

- 5) Fixed pulley is a type of first-class lever.

Because the fulcrum is between the effort and the load.

- 6) Effort and load can be equal only in first-class Levers.

Because the fulcrum is located between the effort and the load.

- 7) Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals.

unit 3

Because of the crossing over phenomenon and the fusion of male and female gametes from two different parents.

- 8) The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity.

Because the genetic information (DNA) carried on those chromosomes differs from one species to another.

- 9) Petals in many flowers are brightly colored and have a Fragrant scent.

Petals are brightly colored/fragrant: To attract insects for the pollination process.

- 10) Anthers hang outside the flowers of some plants that are pollinated by wind.

To be easily opened by air currents to scatter pollen.



11) Pollen grains in insect-pollinated plants are sticky or rough.

To stick easily to the bodies of visiting insects.

12) The importance of the floral envelope in flowers such as the Narcissus flower.

To protect the internal reproductive organs from environmental harm.

13) Wind-pollinated plants produce pollen grains in very large numbers.

To compensate for the large amount of pollen lost in the air.

14) The variety of weather and climate elements.

unit 4

Due to the difference in temperature, pressure, wind, and humidity from one place to another.

15) The existence of different thermal zones on the Earth's surface.

Because of the Earth's spherical shape and the tilt of its axis, which makes sunlight hit the surface at different angles.

16) The occurrence of sea breeze.

Due to the difference in temperature between land and sea during the day (land heats up faster).

17) The difference in the daily temperature range from one city to another.

Influenced by geographic location, proximity to water bodies, and cloud cover.

18) The variation of atmospheric pressure from one region to another.

Due to differences in temperature and altitude above sea level.

19) The effect of humidity on atmospheric pressure.

Moist air is less dense than dry air, so as humidity increases, atmospheric pressure decreases.

20) The decrease in temperature with increasing distance away from the Equator.

Because solar radiation hits at a more inclined angle, spreading over a larger area.

21) Temperature is considered the most important climatic element.

Because it affects all other climatic elements like pressure, wind, and rain.



22) Areas close to the Equator are characterized by high temperatures.

Because the sun's rays fall vertically on the equator.

23) The occurrence of land breeze.

Due to land cooling down faster than sea water at night.

24) Temperature decreases as we rise above sea level.

Because we move away from the Earth's surface (the heat source) and the air becomes less dense.

25) The daily average temperature differs from one city to another.

Due to the change in solar radiation intensity and location.

26) Atmospheric pressure decreases with increasing altitude above sea level.

Due to the decrease in the length and weight of the air column.

27) Temperature affects atmospheric pressure.

High temperature causes air to expand and rise (low pressure), while low temperature makes air dense (high pressure).

28) Temperature is affected by differences in lines of latitude.

It determines the angle of solar rays (vertical or oblique).

29) Temperature is affected near water bodies.

Water moderates temperature (cooler in summer, warmer in winter).

30) The rate of influenza spread increases in winter.

Because low temperatures and low humidity help the virus survive and spread.

31) The Stevenson screen is painted with white color.

To reflect solar radiation.

32) The radiosonde balloon bursts when it reaches high altitudes.

Because atmospheric pressure decreases, making the gas inside expand until it pops.

33) The Stevenson screen is placed away from trees and buildings.

To avoid the influence of heat radiation or wind obstruction from structures.

34) Weather forecasts are not absolute facts.

Because they are based on expectations and variables that can change.



35) The importance of satellites in meteorology.

They track large-scale weather systems like hurricanes.

36) The Stevenson screen is raised 120 cm above ground level.

To avoid the effect of heat radiated from the ground surface.

37) The presence of slanted openings in the walls of The Stevenson screen.

To allow free air entry while blocking direct sunlight.

38) The radiosonde balloon is filled with helium or hydrogen gas.

Because they have very low density (lighter than air).

39) Khamaseen winds have harmful health effects.

They carry dust and sand which cause respiratory problems.

40) The accuracy of weather forecasts decreases as the time period increases.

Because weather variables become more unpredictable over long periods.

## 4 what happen if

## Unit 2

1) The levers were not detected.

Tasks would be much harder and require more physical effort.

2) If the effort arm is longer than the load arm in the levers.

The lever saves effort because the effort needed is less than the load.

3) Anthers and stigmas do not mature at the same time?

unit 3

Self-pollination cannot occur; the plant must rely on cross-pollination

4) A pollen grain falls on the stigma of a flower of a different species?

The pollen grain will not germinate, and fertilization will not occur.

5) The gynoecium is removed from a typical flower before it blooms?

The flower will not be able to produce fruits or seeds (it becomes a male flower).

6) Increase both of the maximum and minimum temperatures?

The daily average temperature increases, and the daily temperature range might change.



7) We move higher above sea level?

Atmospheric pressure and temperature both decrease.

8) The specific heat of water differs from that of land at night?

This causes the land to cool faster than water, creating a "land breeze."

9) We move closer to or farther away from the Equator?

unit 4

Tasks would take more effort and time.

10) Humidity increases (with respect to pressure)?

The lever saves effort.

11) Temperature increases (with respect to pressure)?

Self-pollination will not occur; cross-pollination happens.

12) The Earth stopped rotating?

Winds would move in straight lines from poles to equator (no Coriolis effect).

13) Meteorological satellites disappeared?

We couldn't track global storms or get large-scale weather images.

14) Atmospheric pressure became equal between two cities?

No wind would blow between the two cities.

## 5 Answer the following

## Unit 2

1) Mention the importance of each of the following:

1. lever : Making tasks easier by increasing force, distance, or speed.
2. Tweezers : Accuracy in performance (picking up small objects).
3. Crowbar : Increasing force to move heavy objects.
4. Forceps: Picking up very small objects.



**2) Problem:**

1-A type of first class lever had a force of 40 N and a effort arm of 5 cm. It affected a load of 100 N.

Calculate the length of the load arm? Does the lever save effort or not?

$$40 \times 5 = 100 \times L.$$

$$\text{Load arm} = 200 / 100 = 2 \text{ cm.}$$

Does it save effort? Yes, because effort (40N) < load (100N).

**3) Imagine trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum.**

1 - What type of levers will be used?

**First-class.**

2 - Will you choose a long or short column to get the job done?

**Long (to save effort).**

3 - Where will you put the small stone in relation to the huge rock?

**Near the rock.**

**4) A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.**

$$30 \times 20 = 600.$$

$$20 \times 10 = 200$$

1 -Is this lever balanced? and why?

**No, moments are not equal.**

2 - If the lever is unbalanced, what is the length of the load arm that achieves balance?

$$600 = 20 \times \text{Load arm} \rightarrow \text{Load arm} = 30 \text{ cm.}$$

**5) Using the following table, find the value of x, y and state the law of levers.**

| Effort (Newton) | Effort Arm (cm) | Load (Newton) | Load Arm (cm) |
|-----------------|-----------------|---------------|---------------|
| x               | 5               | 1             | 10            |
| 4               | 5               | 2             | y             |

$$x = (1 \times 10) / 5 = 2 \text{ N.}$$

$$y = (4 \times 5) / 2 = 10 \text{ cm.}$$



- 6) The weight of a wheelbarrow carrying sand is 900 N. If the distance from the wheel (fulcrum) to the center of gravity of wheelbarrow (load) is 0.4 m, and from the wheel to the hand position on the handle (Effort) is 1.2 m:

(1) What is the lever type? Explain your answer.

Yes it save effort , Second class lever, because the load is located between the fulcrum and the effort.

2) Does the wheelbarrow save effort? Justify your answer mathematically

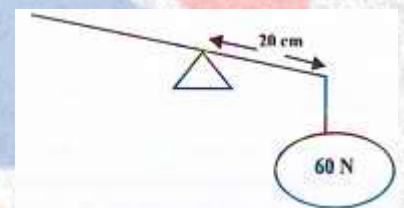
**Mechanical advantage of the lever**

$$= \frac{\text{Effort arm}}{\text{Load arm}} = \frac{1.2}{0.4} = 3$$

- 7) In the corresponding figure:

On what dimension of the fulcrum does a load of 30 N is hanged, to balance the lever?

$$30 \times \text{arm} = 1200 \rightarrow \text{arm} = 40 \text{ cm from the fulcrum}$$



- 8) A lever is acted upon by an effort of 30 N with an effort arm of 20 cm, and a load of 20 N with a load arm of 10 cm.

1. Is the lever in equilibrium? Why?

2. If the lever is not in equilibrium, what should be the length of the load arm to achieve equilibrium.

1. No, because the two moments are not equal.

$$2. 30 \text{ N} \times 20 \text{ cm} = 20 \text{ N} \times L$$

$$600 = 20 \times L$$

$$L = 600 \div 20$$

$$L = 30 \text{ cm}$$

The length of the load arm should be 30 cm to achieve equilibrium

- 9) Pollination and Fertilization in Flowers

unit 3

Based on your study of the types of pollination, determine the type of pollination in each of the following cases:

1. The androecium and gynoecium mature at the same time.

(Mature at same time → Self-pollination )



2. The anthers are far from the stigmas or are at a higher level than them.

( **Anthers higher/far → Cross-pollination** )

3. All flowers are unisexual.

( **Unisexual flowers → Cross-pollination** )

4. Flowers remain closed and do not bloom until pollination.

( **Remain closed → Self-pollination** )

10) Choose the odd word out, then state the relationship between the remaining ones:

- Zucchini - Date palm - Tomato – Maize

Odd word: Tomato. (Zucchini, Date palm, and Maize are Unisexual, while Tomato is Bisexual).

- Stigma - Style - Ovary – Filament

Odd word: Filament. (Stigma, Style, and Ovary are parts of the Carpel/Gynoecium, while Filament is part of the stamen).

11) Self-pollination and cross-pollination (definition and method).

Self: Transfer of pollen within the same flower or plant.

Cross: Transfer of pollen between two different plants of the same species.

12) Mention the importance of each of the following:

1. Mitosis in humans: **Growth and replacing damaged cells.**
2. Meiosis in humans: **Producing gametes for reproduction.**

13) Based on your study of the structure of the typical flower, complete the following table:

| Floral whorl | Main function                                                      | Name of the leaf forming it |
|--------------|--------------------------------------------------------------------|-----------------------------|
| Calyx        | Protects the inner parts of the flower before blooming.            | Sepals                      |
| Corolla      | Attracts insects for pollination and protects reproductive organs. | Petals                      |
| Androecium   | Production of pollen grains (Male organ).                          | Stamens                     |
| Gynoecium    | Production of ovules (Female organ).                               | Carpels                     |



14) What is the importance (benefit) of each of the following:

1) The difference in atmospheric pressure between two regions.

**Causes air to move (wind) from high to low pressure areas.**

2) Knowing the direction of the Coriolis effect.

**Determines the direction of winds .**

3) Weather maps.

**Helping pilots and sailors navigate and predicting weather changes.**

4) The white color of the Stevenson screen

**To reflect sunlight and prevent heating the instruments.**

5) The slanted openings in the Stevenson screen.

**To allow air circulation while protecting instruments from direct sun/rain.**

6) Placing the Weather Kiosk away from trees and buildings.

**To get accurate readings unaffected by heat or wind blocks.**

7) The radiosonde balloon.

**Carrying instruments to measure weather in the upper atmosphere.**

8) Meteorological satellites.

**Providing images and data about clouds and storms from space.**

9) The parachute in the radiosonde.

**To ensure the instruments return safely to Earth after the balloon bursts.**

10) Weather Forecast Icons (Symbols)

**To represent weather conditions (rain, sun, wind) simply on maps.**

6

Mark (✓) or (x), with correction :

Unit 3

|    |                                                                                                  |     |
|----|--------------------------------------------------------------------------------------------------|-----|
| 1) | Gametes contain a diploid number of chromosomes (2n).                                            | (x) |
| 2) | Asexual reproduction takes place by mitosis.                                                     | (✓) |
| 3) | Cancerous tumors result from repeated abnormal meiotic divisions.                                | (x) |
| 4) | Crossing-over phenomenon between chromosomes contributes to genetic diversity among individuals. | (✓) |



|     |                                                                                                             |     |
|-----|-------------------------------------------------------------------------------------------------------------|-----|
| 5)  | Winds move in completely straight paths from the poles to the equator.                                      | (x) |
| 6)  | Wind speed increases when the difference in atmospheric pressure is large.                                  | (✓) |
| 7)  | In the Northern Hemisphere, winds rotate around the center of a low-pressure system anticlockwise direction | (✓) |
| 8)  | Cold, moist air in polar regions forms a high-pressure area.                                                | (x) |
| 9)  | The Coriolis effect is responsible for winds moving in curved paths.                                        | (✓) |
| 10) | Lines of equal pressure are called isobars.                                                                 | (✓) |
| 11) | At the center of a low-pressure system, pressure values are higher than in surrounding areas.               | (x) |

## 7 Choose the correct answer:

## Unit 2

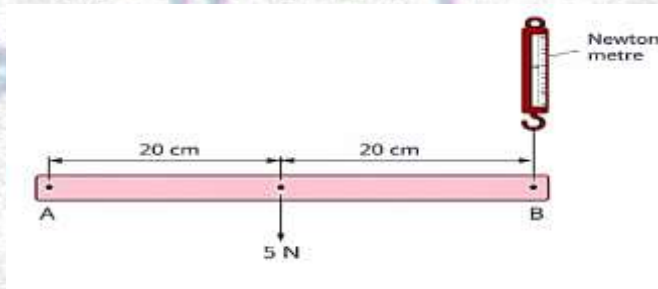
1) When the lever is at equilibrium.....

- a) Effort x load arm = load x Effort arm
- b) Moment of effort > Moment of load
- c) Effort x its arm > load x its arm
- d) Moment of effort = Moment of load

2) Ice tongs.....

- a) have a mechanical advantage equal to 1
- b) are a third-class lever.
- c) have a mechanical advantage greater than 1
- d) are a second-class lever.

3) A metal rod AB of weight 5 N is able to rotate around point A



What is the reading of the Newton meter when the rod is balanced horizontally?

- a) 2.5N
- b) 5N
- c) 8N
- d) 10 N



4) The cells of parts illustrated in the opposite figure contain the same number of

- a) ATP molecules.
- b) gametes.
- c) chromosomes (2n).
- d) chromosomes (n).



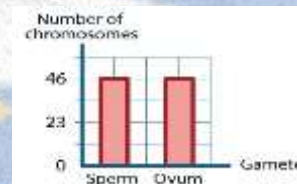
5) Which of the following represents the number of chromosomes found in human gametes?



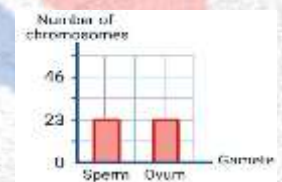
(a)



(b)



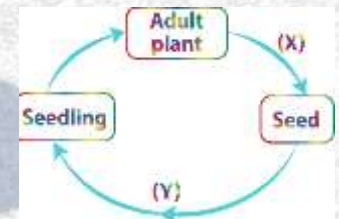
(c)



(d)

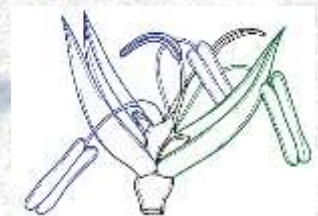
6) The opposite figure illustrates the life cycle of a flowering plant: Which of the following describes both processes Choose x and (Y)?

- a) (x): Germination and fertiization ,(Y) Pollinasion.
- b) (x): Pollination and fertillzation . ,(Y) Germination.
- c) (x): Pollination ,(Y): Fertilization and germination
- d) (x): Fertilization. ,(Y) Pollination and germination.



7) The coposite figure illustrates the structure of a flower. Which of the following describes this flower?

- a) Bisexual, insect-pollinated
- b) Unisexual, wind-pollinatod
- c) Unisexual, insect-pollinated
- d) Bisexual, wind-pollinaled



8) From the opposite figure Which letter indicates cross-pollination?

- a) (A)





b) (B)

c) (C)

d) (D)

9) Which statement correctly describes

he petunia flower?

a) Its petals are arranged in a single whorl.

b) Its petals are green in colour.

c) Its sepals are separate.

d) The number of its sepals is double the number of its petals

10) What occurs immediately after fertilization in sexual reproduction?

a) A zygote with a tetraploid chromosome number ( $4n$ ) is formed.

b) The zygote begins to divide mitotically.

c) The zygote undergoes meiotic division.

d) A zygote with a haploid chromosome number ( $n$ ) is formed.

11) Winds arise as a result of differences in ..... between  
Neighboring areas

unit 4

a) temperature

b) atmospheric pressure

c) humidity

12) Air always moves from areas of ... pressure to areas of ..... pressure.

a) high/low

b) low/high

c) low/low

13) The rotation of the Earth around its axis causes the deflection of winds,  
known as.....

a) greenhouse effect

b) Coriolis effect

c) atmospheric pressure

14) Winds are deflected in the Northern Hemisphere to the ..... of their  
original direction.

a) right

b) left

c) east



15) Winds are deflected in the Southern Hemisphere .....  
the clockwise direction

- a) with                      b) against                      c) parallel to
- 

16) Wind deflection is greatest at the.....

- a) equator                      b) poles                      c) tropics
- 

17) A high atmospheric pressure area is represented by the symbol .....

- a) L                      b) H                      c) P
- 

18) On weather maps, the lines that connect points of equal pressure  
are called .....

- a) isobars                      b) lines of longitude                      c) elevations
- 

19) A low-pressure area is represented by the color

- a) blue                      b) red                      c) yellow
- 

20) A low-pressure area (L) forms at the .....

- a) poles                      b) equator                      c) cold regions
- 

21) Weather forecasts help farmers determine the times of.....

- a) irrigation                      b) harvesting                      c) both of them
- 

22) One of the safety measures during Khamaseen winds is.....

- a) wearing a mask                      b) traveling by sea                      c) irrigating crops
- 

23) A weather forecast for ... is more accurate than a one-week forecast.

- a) two days                      b) a month                      c) a year
- 

24) Weather forecast aim in protection of lives from ..

- a) earthquakes                      b) thunderstorms                      c) volcanoes
-



25) Aircraft navigation mainly depends on knowing

a) weather maps

b) ocean depths

c) forests

---

26) The most important climatic element is .....

a) temperature.

b) atmospheric pressure.

c) humidity

d) wind

---

27) Normal atmospheric pressure equals

a) 1013.25 mm Hg

b) 700 mb

c) 1013.25 mb

d) 760 cm.Hg

---

28) Which of the following is correct?

a) Temperatures are equal at latitude 30' North and latitude 0"

b) Temperatures are equal at latitude 30" South and the Equator.

c) Temperature at latitude 60" North is higher than at latitude 0" in winter.

d) Temperature at latitude 60" North is lower than at the Equator in winter

---

29) Which of the following expresses Coriolis Effect?

a) Its effect reaches its maximum at the Equator.

b) it causes wind to be deflected to the left in the Southern Hemisphere.

c) It does not cause wind deflection in the Northern Hemisphere.

d) Its effect becomes clear when atmospheric pressure values differ.

---

30) Air currents in a low-pressure system rotate.....

a) in a clockwise direction, outward away from the system.

b) in a clockwise direction, inward toward the center of the system.

c) in an anticlockwise direction, outward away from the center of the system.

(d) in an anticlockwise direction, inward toward the center of the system.

---

31) Radiosonde sensors collect weather data while they are in.....

a) the atmosphere.

b) the oceans.

c) weather station shelters

d) weather stations

---



8 what is meant by

## Unit 2

|                               |                                                                                                                                               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Simple Machine                | A device used to perform tasks more easily.                                                                                                   |
| Lever                         | A rigid bar that rotates around a fixed point (fulcrum) and is affected by effort and load.                                                   |
| Fulcrum                       | The fixed point on which the lever rotates.                                                                                                   |
| Effort arm                    | The distance between the effort force and the fulcrum.                                                                                        |
| Load arm                      | The distance between the load (resistance) and the fulcrum.                                                                                   |
| The Law of Levers             | Effort $\times$ its arm = Load $\times$ its arm.                                                                                              |
| Moment of effort              | The product of effort force and its arm.                                                                                                      |
| Moment of load                | The product of load force and its arm.                                                                                                        |
| Mechanical advantage of lever | The ratio between the load and the effort.                                                                                                    |
| Somatic cells                 | All body cells that contain the full set of chromosomes (2n) and divide by mitosis.                                                           |
| Asexual reproduction          | A process where a single parent produces offspring that are genetically identical to itself without the need for gametes.                     |
| Reproductive cells            | Also known as gametes (sperm and ova), these are cells produced by reproductive organs that contain half the number of chromosomes (n).       |
| Mitosis                       | A type of cell division where one somatic cell divides into two identical daughter cells, each containing the same number of chromosomes (2n) |
| Meiosis                       | type of division occurs in gonad cells which each diploid cell 2n divides into 4 haploid cells 2                                              |
| Genetic crossing over         | A phenomenon occurs in meiosis 1 where exchange in genetic materials leads to diversity of genetic traits                                     |
| Flower                        | A short stem whose leaves are modified to carry out reproduction                                                                              |
| Typical flower                | A flower that contains the four floral whorls                                                                                                 |

unit 3

|                           |                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Floral envelope           | The outer two whorls (Calyx and Corolla) combined .                                                                       |
| Androecium                | The male reproductive organ consisting of stamens.                                                                        |
| Gynoecium                 | The female reproductive organ consisting of carpels.                                                                      |
| Bisexual flower           | A flower that carries both male and female organs .                                                                       |
| Unisexual flower          | A flower that carries either male organs or female organs only.                                                           |
| Pollination               | The process of transferring pollen grains from anthers to stigmas.                                                        |
| Fertilization             | The fusion of a male nucleus (pollen grain) with a female nucleus (ovum) to form a zygote.                                |
| Weather                   | The state of the atmosphere in a short period of time, such as a day or a week.                                           |
| Climate                   | The average weather conditions in a specific region over a long period of time, such as years.                            |
| Maximum temperature       | The highest temperature recorded during the day.                                                                          |
| Minimum temperature       | The lowest temperature recorded during the night.                                                                         |
| Daily average temperature | The average of the maximum and minimum temperatures recorded in 24 hours.                                                 |
| Daily temperature range   | The difference between the maximum and minimum temperatures during one day.                                               |
| Atmospheric pressure      | The weight of an air column of an atmospheric height acting on a unit area.                                               |
| Humidity                  | The amount of water vapor present in the atmosphere.                                                                      |
| Absolute humidity         | The actual mass of water vapor present in a specific volume of air.                                                       |
| Relative humidity         | The ratio between the actual amount of water vapor in the air and the maximum amount it can hold at the same temperature. |
| Winds:                    | Movement of air from high-pressure areas to low-pressure areas.                                                           |
| Coriolis effect:          | The deflection of winds due to Earth's rotation.                                                                          |
| Isobars:                  | Lines on a map connecting points of equal atmospheric pressure.                                                           |

unit 4



|                                        |                                                                         |
|----------------------------------------|-------------------------------------------------------------------------|
| Low-pressure system (L):               | An area where air pressure is lower than the surroundings (Symbol: L).  |
| The Weather Kiosk (Stevenson's Kiosk): | A white wooden box used to protect weather Temperature humidity.        |
| Weather forecasting:                   | Predicting future atmospheric conditions based on data.                 |
| Radiosonde:                            | A tool sent by balloon to measure weather in upper layers.              |
| Meteorological buoys:                  | Floating devices that collect weather data from oceans.                 |
| High-pressure system:                  | An area where air pressure is higher than the surroundings (Symbol: H). |
| Khamaseen winds:                       | Seasonal dusty winds that blow in Egypt during spring.                  |

## 9 compare between eqch of the following

## Unit 2

- 9) The first, second and third class of levers in terms of: (definition - mentioning an example of each type - saving effort ).

|                                   | First class levers                                                               | Second class levers                                                              | Third class levers                                                               |
|-----------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Positions of their three elements | The fulcrum (F) (pivot point) is located between the effort (E) and the load (L) | The load (L) is located between the fulcrum (F) (pivot point) and the effort (E) | The effort (E) is located between the fulcrum (F) (pivot point) and the load (L) |
| Mechanical advantage              | Less than, greater than or equal to 1                                            | Always greater than 1                                                            | Always less than 1                                                               |
| Examples                          | - Seesaw.<br>- Crowbar.<br>- Pliers.<br>- Scissors.                              | - Wheelbarrow.<br>- Nutcracker.<br>- Lemon squeezer.<br>- Bottle opener.         | - Tennis racket.<br>- Tweezers.<br>- Coal tongs.<br>- Broom.                     |

10) a) Somatic cells and reproductive (germ) cells.

## 1. Somatic cells:

Contain full number of chromosomes (2n) and divide by mitosis.

## 2. Reproductive cells:

Contain half the number of chromosomes (n) and are produced by meiosis.

b) Sexual reproduction and asexual reproduction.

## 1. Sexual reproduction:

Requires two parents, produces genetic variation, and depends on meiosis.

## 2. Asexual reproduction:

Requires one parent, produces identical offspring, and depends on mitosis.

11) Pollination and Fertilization in FlowersMeans of Pollen Grain Transfer

| Aspect of comparison | Insect pollination | Wind pollination |
|----------------------|--------------------|------------------|
| Color of petals      | Bright             | Dull             |
| Size of petals       | Large              | Small            |
| Scent and nectar     | Present            | Absent           |
| Anthers              | Firm               | Pendent          |
| Pollen grains        | Sticky             | Light & Dry      |
| Stigmas              | Sticky             | Feathery         |

12) Compare between self-pollination and cross-pollination

(in terms of definition and how each occurs)

|                                                           | Self-pollination                                                                                                                                            | Cross-pollination                                                                                                                                        |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Definition                                                | The process of the transfer of pollen grains from the anther of a flower to the stigma of the same flower or the stigma of another flower in the same plant | The process of the transfer of pollen grains from the anther of a flower in a plant to the stigma of another flower in another plant of the same species |
| Characteristics of flowers which undergo this pollination | (1) Simultaneous maturity of the stamens and the pistil at the same time.                                                                                   | (1) Stamens and pistil do not mature at the same time.                                                                                                   |



|  |                                                                                                                                                                                    |                                                                                                              |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  | <p>(2) Anthers are at the same level as stigmas or slightly higher than them.</p> <p>(3) In some cases, flowers remain closed and do not bloom until pollination is completed.</p> | <p>(2) Anthers are found far from the stigmas or at a lower level.</p> <p>(3) All flowers are unisexual.</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|

**13) Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.**

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| Wind-pollinated are light and dry | Insect-pollinated are sticky or rough. |
|-----------------------------------|----------------------------------------|

**1. Bisexual flowers and unisexual flowers.**

|                                       |                                                 |
|---------------------------------------|-------------------------------------------------|
| Bisexual has both stamens and carpels | Unisexual has only one (either male or female). |
|---------------------------------------|-------------------------------------------------|

**2. Androecium and gynoecium in terms of structure and function.**

|                                                |                                                  |
|------------------------------------------------|--------------------------------------------------|
| Androecium is the male organ (produces pollen) | Gynoecium is the female organ (produces ovules). |
|------------------------------------------------|--------------------------------------------------|

**14) Weather and Climate.**

Unit 4

|                                                                                        |                                                                                                     |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <p>1. Weather:</p> <p>The state of the atmosphere in a short period (day or week).</p> | <p>2. Climate:</p> <p>The average state of the atmosphere over a long period (months or years).</p> |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|

**15) Daily average temperature and daily temperature range.**

|                                                                                                                   |                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <p>1. Daily temperature range</p> <p>The difference between the maximum and minimum temperatures for one day.</p> | <p>2. Daily average temperature</p> <p>The arithmetic mean of the maximum and minimum temperatures for one day.</p> |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|



16) Compare between land breeze and sea breeze

(Two points only).

|                                   | Land breeze                   | Sea breeze                    |
|-----------------------------------|-------------------------------|-------------------------------|
| Time of occurrence                | At night                      | During the daytime            |
| Direction of movement of cool air | From the land towards the sea | From the sea towards the land |

10 correct the following statement

Unit 2

14) Soda water opener is a type first class lever

(Second class lever).

15) One of the functions of the levers is to reduce the effort as in manual broom.

To increase the effort (or "increase speed/distance").

16) The first type of levers differ from the second type of levers in the presence of an effective effort.

The position of the fulcrum (or "saving effort").

17) Gamete cells contain the full number of chromosomes found in  
18) somatic cells.

half the number (n).

19) Mitosis is known as reduction division. equational.

20) Asexual reproduction depends on meiosis. mitosis.

21) The first meiotic division is a mitotic division. The second.

22) Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals. Sexual reproduction.

23) after the second meiotic division, two cells are produced containing half the original number of chromosomes (n). four cells.

24) A bottle opener is a first-class lever. Second-class.

25) One function of levers is decreasing force as in the hand broom. Increasing.

Unit 3

Unit 4



26) First-class levers differ from second-class levers in the presence of an applied force. **Position of the fulcrum.**

27) A fishing rod is a second-class lever. **Third-class.**

28) Vegetative reproduction is a form of sexual reproduction. **Asexual.**

## 12 various questions

## Unit 2

1) The following figures represents a lever from

Unit 2

|                                                                                  |                                                                                    |                                                                                     |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |
| <b>First-class lever type</b>                                                    | <b>Third-class lever type</b>                                                      | <b>Second-class lever type</b>                                                      |
| 1. Head/Neck: <b>First-class lever.</b>                                          | 2. Arm: <b>Third-class lever.</b>                                                  | 3. Foot/Leg: <b>Second-class lever.</b>                                             |

2) From the two figures



Which figure represents a better way to lift the rock? Explain your answer.

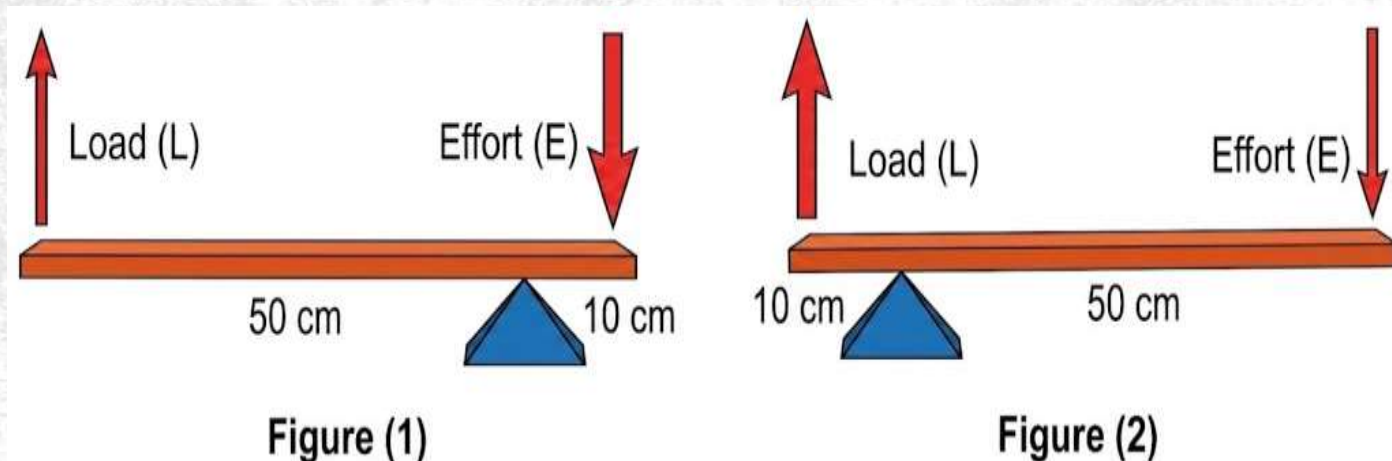
\* **Figure (1)/** Because the effort arm in figure (1) is greater than in figure (2) and the greater of the effort arm in the lever, the less effort is required and thus more effort is saved.

What can be done to increase the mechanical advantage of this lever?

\* **To increase the mechanical advantage, the fulcrum is moved towards the stone (load) to increase the effort arm.**



3) The following two figures represent a type of levers:



(1) What type of lever is this? Explain your answer.

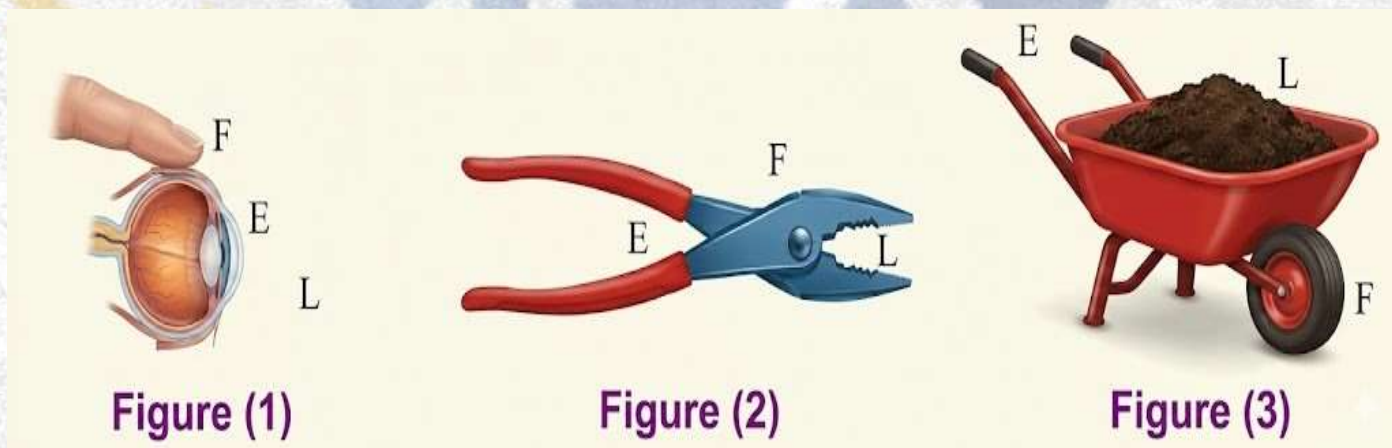
**First class lever, because the fulcrum is located between the effort and the load.**

(2) Which figure represents the lever when it has a greater mechanical advantage? Find its value.

**Figure (2) / Mechanical advantage**

$$= \frac{\text{Effort arm}}{\text{Load arm}} = \frac{50}{10} = 5$$

4) Classify the levers shown in the figures below in terms of their types:



- Figure (1): Third class lever.
- Figure (2): First class lever
- Figure (3): Second class lever.



5) Look at the following figure, then complete the data:

|                                                                              |                                                                         |                                              |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|
| Homologous chromosomes <b>Non-sister chromatids twist around one another</b> | <b>Non-sister Exchange of genetic segments</b> twist around one another | <b>Exchange of Crossing over</b> phenomenon. |
| <b>Crossing over Phenomena</b>                                               |                                                                         |                                              |

6) Study the figures in front of you, then identify the name of the plant and state the difference between them in terms of (petals and sepals).

| Name of the plant | Sepals           | Petals             |
|-------------------|------------------|--------------------|
| Rosa              | Green & separate | Colored & separate |
| Petunia           | Fused            | Fused (Perianth)   |

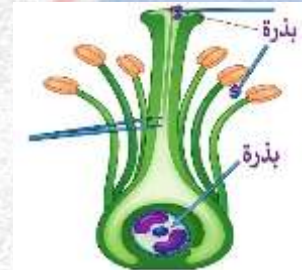
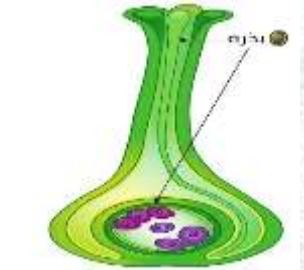


- 7) Observe the following flowers, then determine the sex of each flower and explain the reason:

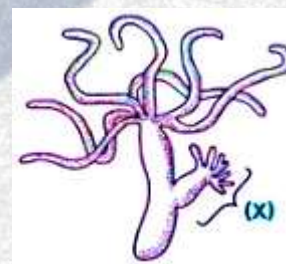
|                                                                                  |                      |                                                                                   |                      |                                                                                     |                      |
|----------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|----------------------|
|  | The flower:<br>..... |  | The flower:<br>..... |  | The flower:<br>..... |
| The flower: <b>Bisexual</b><br>Reason: <b>Has stamens and carpels</b>            |                      | The flower: <b>Male</b><br>Reason: <b>Has stamens only</b>                        |                      | The flower: <b>Female</b><br>Reason: <b>Has carpels only</b>                        |                      |

### 8) Fertilization

Determine the steps of fertilization and fruit formation:

|                                                                                    |                                                                                    |                                                                                     |                                                                                      |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |  |
| <b>Pollination</b>                                                                 | <b>Pollen tube growth</b>                                                          | <b>Fertilization</b>                                                                | <b>Seed formation</b>                                                                |

- 9) The figure shows the reproduction of a living organism produced by a single parent:



(1) Is the number of chromosomes in the cells of part (X) resulting from the reproduction

process equal to (n) or (2n)? **(2n)**

(2) What is the type of this reproduction?

**Asexual reproduction.**

(3) Does this reproduction occur through meiosis or mitosis? **Mitosis.**



10) The diagram shows the reproduction cycle of the squirrel in which the zygote contains 40 chromosomes :

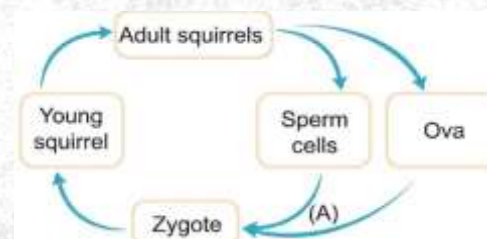
(1) What is the name of process (A)?

Fertilization process.

(2) What is the number of chromosomes in each cell of:

1- Young squirrel. 40 chromosomes.

2- The ova. 20 chromosomes.



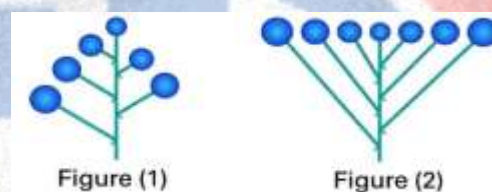
11) In front of you are two examples of inflorescences you have studied

Compare between them in terms of:

(1) Type of inflorescence.

(2) Length of the peduncle.

(3) Reason for naming.

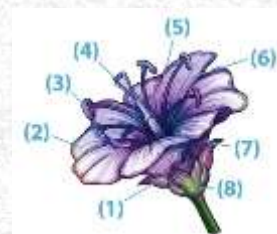


|                              | Shape (1)                                                                                                                   | Shape (2)                                                                                                                |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| (1)<br>Type of inflorescence | Simple raceme inflorescence                                                                                                 | Simple corymb inflorescence                                                                                              |
| (2)<br>Peduncle length       | Long                                                                                                                        | Short                                                                                                                    |
| (3)<br>Reason for naming     | Flowers emerge from all directions, and each with a small stalk (pedicel), giving it a shape similar to a cluster of grapes | Flowers emerge on both sides of the peduncle, and all are almost at the same level, giving it a shape similar to a comb. |



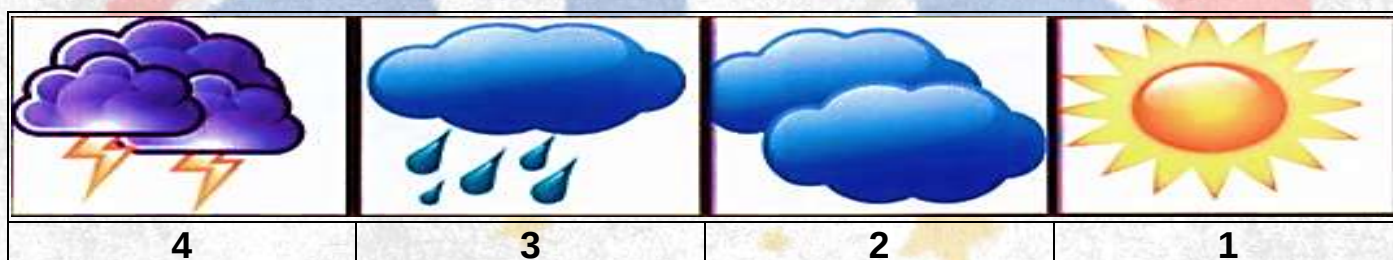
**12) Replace the numbers shown in the opposite figure with the appropriate labels.**

- (1) Sepal.                      (2) Petal.  
 (3) Anther.                    (4) Stigma.  
 (5) Style.                      (6) Filament.  
 (7) Ovary.                    (8) Receptacle.



**13) Identify the symbols:**

Unit 4



1. The symbol that represents a thunderstorm is **4**
2. The symbol that represents sunny weather is **1**
3. What does symbol (3) indicate on weather maps?

**Rainy weather**

**14) The following figure represents one of the natural phenomena**

(1) What is the name of this phenomenon?

Does it occur during the day or at night?

**Sea breeze / It occurs during the daytime.**

(2) According to what you have studied.

mention. What is the cause of this phenomenon?

**The specific heat of water is higher than that of the adjacent land.**





15) The opposite figure shows a device placed at the base of a mountain once and at its peak another time.

(1) What is the name of this device and what is it used for?

**Mercury barometer / It used to measure atmospheric pressure.**

2) Identify which figure, (X) or (Y), represents the device when it is at the peak of the mountain. Explain your answer

**Figure (X)/ Because as we rise above sea level, the atmospheric pressure decreases and thus the height of the air column affecting the unit area decreases and therefore the height of the mercury column decreases.**



16) What does each of the numbers shown on the following map indicate?



(1) Rainfall.

(2) Partly sunny with cloud formation.

(3) Sunny weather.

(4) Thunder and lightning.



حمل الآن

مجاناً وحصرياً

# المراجعة رقم (3)

## الترم الثاني





**Q1: Choose the correct answer from the given answers:**

1- The correct definition of endothermic dissolution is.....

- (a) A process in which thermal energy is absorbed from the surrounding environment.
- (b) A process in which no exchange of thermal energy occurs.
- (C) A process in which chemical energy is converted into thermal energy.
- (d) A process in which thermal energy is released into the surrounding environment.

2- A common example of endothermic dissolution is

- (a) The dissolution of sodium carbonate.
- (b) Dissolving  $(\text{NH}_4\text{NO}_3)$  in water.
- (C) The dissolution of sodium hydroxide.
- (d) The dissolution of calcium chloride.

3- A common example of exothermic dissolution is.....

- (a) Dissolving potassium sulphate.
- (b) Dissolving ammonium nitrate  $(\text{NH}_4\text{NO}_3)$  in water.
- (C) Dissolving sodium hydroxide.
- (d) Dissolving  $\text{NaHCO}_3$

4- When instant cold compresses are used, they work by..... the blood vessels in the affected area, which leads to reduced blood flow and reduced swelling.

Widening (b) narrowing (C) Heating (d) Dissolving

5- .....Raise the temperature of the water when dissolved in it.

- (a) Ammonium nitrate
- (b) Potassium chloride
- (C) Sodium hydroxide.
- (d) Hydrated copper sulfate.

6. In exothermic reactions, the final temperature ( $T_2$ ) is..... the initial temperature ( $T_1$ )

- a) Lower than    b) higher than    c) equal to    d) half



7. When a magnesium strip reacts with diluted hydrochloric acid, heat is transferred from ...

- a) The surrounding medium to the system
- b) The system to the surrounding medium
- c) The products to the reactants
- d) The beaker to the thermometer only

8. Which of the following reactions is an example of an endothermic reaction?

- a) Magnesium reacting with hydrochloric acid
- b) Calcium oxide reacting with water
- c) Barium hydroxide reacting with ammonium chloride
- d) Thermite reaction

9. The German scientist who proved that energy cannot be created or destroyed is:

- a) Einstein
- b) Newton
- c) Hermann von Helmholtz
- d) Dalton

10. The process of breaking the bonds between atoms in reacting substances is:

- a) Exothermic
- b) endothermic
- c) Not accompanied by heat change
- d) produces electrical energy

11. In the energy diagram of an exothermic the energy level of the products is .....  
the energy level of the reactants

- a) Higher than
- b) lower than
- c) equal to
- d) parallel to

12. The substance..... is used in self-heating packages.

- a) Ammonium chloride
- b) Calcium oxide (quicklime)
- c) Sodium bicarbonate
- d) Ammonium nitrate





**13.** The substance responsible for the "refreshing sensation" (coolness) when eating fizzy sweets is.....

- a) Citric acid only
- b) Glucose
- c) A mixture of sodium bicarbonate and citric acid
- d) Iron oxide

**14.** The thermite reaction is used in.....

- a) Cooling drinks
- b) welding railroad tracks
- c) Making lemon batteries
- d) making candy

**15.** If the energy released when bonds are formed is greater than the energy absorbed when bonds are broken, the reaction is.....

- a) Endothermic
- b) Exothermic
- c) Thermally neutral
- d) Balanced

**16.** In the lemon battery experiment, energy is converted from..... energy to electrical energy.

- a) Thermal
- b) kinetic
- c) chemical
- d) light

**17.** When ammonium chloride powder is added to barium hydroxide and the mixture is stirred, we observe.....

- a) The temperature of the beaker rises.
- b) The mixture ignites.
- c) The temperature of the beaker drops and a layer of frozen water forms.
- d) No change occurs.



**18.** Examples of endothermic reactions in everyday life include.....

- a) The thermal decomposition of limestone
- b) The thermite reaction
- c) Fuel combustion
- d) Respiration in living organisms

**19.** In an endothermic reaction, the value of the change in heat content is.....

- a) Negative
- b) positive
- c) zero
- d) variable

**20-** Any of the following processes is accompanied by a decrease in the temperature of the solution.....

- a) Solubility of sodium hydroxide in water.
- b) The dissolution of ammonium nitrate in water.
- c) Condensation of water vapor.
- d) Dissolving the washing powder in water.

**21-** The thermal change resulting from the melting of a certain amount of solute in a known volume of solvent to form a solution is called.....

- a) Activation energy.
- c) Heat of dissolution.
- b) enthalpy of the material.
- d) Specific heat.

**22-** Which of the following material transformations is considered "exothermic"?.....

- a) Fusion.
- b) Evaporation.
- c) Sublimation.
- d) Freezing.





**23-** In the lithium chloride solubility experiment, if the initial temperature  $T_1 = 21^\circ\text{C}$  and the final temperature  $T_2 = 25.5^\circ\text{C}$  when dissolved 1g

What is the amount of temperature change  $T$  when dissolve 2g in the same amount of water

- a)  $4.5^\circ\text{C}$
- b)  $9^\circ\text{C}$
- c)  $5.31^\circ\text{C}$
- d)  $52.2^\circ\text{C}$

**24 -** Ammonium nitrate is used in the manufacture of cold compresses because of its solubility in water.....

- a) Raises the temperature of the water (exothermic).
- b) Reduces blood flow to the affected area.
- c) It absorbs heat energy from the surrounding medium (endothermic).
- d) Causes instant boiling of water.

**25.** When a crystalline (hydrated) salt such as  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is dissolved in water, the color turns into.....

- a) White.
- b) Pink.
- c) Blue.
- d) The color does not change.

**26-** In the cooling cycle inside the refrigerator at any stage the heat is "absorbed" from the food.....

- a) During the process of compressing the gas by the motor.
- b) While the coolant is expanding and evaporating inside the refrigerator.
- c) While the gas is condensing in the grid behind the refrigerator.
- d) During the transfer of heat to the surrounding medium (air).

**27.** When an exothermic reaction occurs, heat energy is transferred from.....

- a) the surrounding medium to the system.
- b) The system to the surrounding medium.
- c) Thermometer to cup.
- d) Atmospheric air to reactants.



**28.** The combustion process is based on 3 basic elements called "fire represented". Which of the following represents these elements.....

- a) Fuel, nitrogen gas, heat.
- b) Fuel, oxygen gas, heat.
- c) Carbon dioxide, fuel, oxygen.
- d) Water, heat, oxygen.

**29.** It is completely forbidden to use water to extinguish sodium or potassium fires in laboratories.....

- a) Because water evaporates quickly.
- b) Because water freezes when it comes into contact with these metals.
- c) Because the reaction with water is highly exothermic and leads to the ignition of the rising hydrogen gas.
- d) Because the density of water is less than that of sodium.

**30.** If matter (X) has a degree of ignition of  $45^{\circ}\text{C}$  and matter (Y) has a degree of ignition of  $300^{\circ}\text{C}$ . Which of the following statements is correct?

- a) Matter (Y) ignites faster than substance (X).
- b) Material X is safer to store than Material Y.
- c) Matter X ignites faster than Matter Y because it has a lower degree of ignition.
- d) The two substances ignite at the same time.

**31-** When the amount of oxygen is abundant (too sufficient) in a gasoline stove, the flame appears in ..... color.

- a) Yellow.
- b) Red.
- c) Blue (complete combustion).
- d) Orange.

**32.** A small percentage of ethanethiol gas is added to the natural gas used in households

- a) To raise the calorific value of natural gas when it is combusted.
- b) to act as a catalyst that increases the speed of natural gas combustion.
- c) To facilitate the detection of gas leaks due to its characteristic garlic-like smell.
- d) To reduce carbon dioxide emissions from combustion.





**33-** When a stream of hydrogen gas is passed over the heated black copper oxide powder.....

- a) The tube explodes due to the rise of oxygen gas.
- b) No reaction occurs because hydrogen is an inert gas.
- c) Hydrogen oxide is formed and the powder turns into red copper.
- d) The color of the powder changes from black to white.

**34-** Ethanol prepared from cornstarch is a ..... fuel, while hydrogen is a ..... fuel.

- a) Artificially/Biologically
- b) Fossil / Naturally
- c) Biologically/Artificially
- d) Solid/Liquid

**35-** ..... is the substance that gives oxygen during a chemical reaction."

- a) Combustible material
- b) Catalyst
- c) Biofuel
- d) Oxidizing agent

**36-** Water is not used to extinguish oil fires because.....

- a) The density of oil is lower than that of water, so it floats on its surface and remains burning.
- b) The water cools the petroleum quickly, causing it to freeze.
- c) Water chemically reacts with petroleum and produces toxic gases.
- d) Water hydrolyses by heat into oxygen that increases the ignition of a fire.

## **Q2: Correct the following statements:**

- 1- In exothermic reactions, the final temperature  $T_2$  is lower than the initial temperature  $T_1$ .
- 2- The  $\text{CaCO}_3$  decomposition reaction is an example of exothermic reactions.
- 3- The less energy the bond, the harder it is to break.
- 4- In an endothermic reaction, the system absorbs heat energy that causes the increase in the temperature of the surrounding medium
- 5- Self-heating packaging is based on the reaction of calcium oxide with water, which is an endothermic reaction.



- 6- Natural gas is mainly made up of propane gas
- 7- Oxidation is a process that results in a lack of oxygen in a material.
- 8- A reducing agent is defined as the substance that gives oxygen during a reaction.
- 9- The calorific value of wood is higher than the calorific value of hydrogen.
- 10- The acceleration with which the object moves increases as its mass increases when the force is constant.
- 11- The forces of action and reaction affect on the same body and therefore do not cancel each other out.
- 12- Newton's second law is known as the law of inertia.
- 13- If two forces of equal magnitude and opposite in direction act along same line of action, the resultant is the sum of the two forces.
- 14- Mass is considered a vector physical quantity.
- 15- Mitosis is known as reduction division.
- 16- Asexual reproduction depends on meiosis.
- 17- The first meiotic division is a mitotic division.
- 18- Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals.
- 19- After the second meiotic division, two cells are produced containing half the original number of chromosomes (n).
- 20- A bottle opener is a first-class lever.
- 21- One function of levers is decreasing force as in the hand broom.
- 22- First-class levers differ from second-class levers in the presence of an applied force.
- 23- A fishing rod is a second-class lever.
- 24- Vegetative reproduction is a form of sexual reproduction.
- 25- Gamete cells contain the full number of chromosomes found in somatic cells.





**Q3: Give reason for each of the following:**

- 1- We feel cold when washing our hands with antiseptic hand gel
- 2- We feel the warmth of our hands when the laundry powder dissolves in water.
- 3- Special precautions must be taken when diluting concentrated acids by adding the acid to water, not the other way around.
- 4- Instant Hot packs (using magnesium sulfate) are used to relieve pain associated with muscle strain
- 5- The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.
- 6- You feel a cooling sensation in your mouth when you eat fizzy candy containing sodium bicarbonate.
- 7- The reaction of magnesium with hydrochloric acid is an exothermic reaction.
- 8- Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.
- 9- The process of breaking bonds is endothermic, while the formation of bonds is exothermic.
- 10- The difference in heat content between reactants and products in chemical reactions.
- 11- A reaction is called exothermic if the energy released during bond formation is greater than the energy absorbed during bond breaking.
- 12- Scientists resort to using self-heating containers in expeditions or military applications.
- 13- Fireflies are called by this name (in relation to energy transformations).
- 14- A small ratio of ethanethiol gas added to both natural gas and the Buta-gas (Liquefied Petroleum Gas)
- 15- Benzene flame that used in laboratories sometimes appears yellow and sometimes blue
- 16- Spark plugs are used in car engines
- 17- Oxyacetylene flame is used in cutting or welding metals
- 18- Black copper oxide is reduced when a stream of hydrogen gas passed over it.



- 19- Food can be preserved by evacuating air from preservation bags.
- 20- The stationary body remains stationary if it is not affected by force.
- 21- An object moving at a constant speed on a straight line that does not stop on its own
- 22- Water spilling from the cup if the cup is moved suddenly
- 23- Pushing of an empty cart requires less force than pushing a full cart
- 24- Increasing the acceleration the greater the force exerted on the body
- 25- The balloon filled with air bounces when it is released
- 26- The boat moves backwards when you jump from it towards the shore
- 27- A moving ball stops when it hits a wall
28. A ball bounces from another ball when it collides
- 29- The speed of an object changes after a collision with another object.
30. In elastic collisions, there is no loss of kinetic energy.
31. In inelastic collisions, there is a loss of kinetic energy
- 32- The reaction of magnesium with hydrochloric acid is called an exothermic reaction.
- 33- Cooling of the surrounding medium in endothermic reactions.
- 34- The elements (fuel, oxygen, heat) are called the triangle of fire.
- 35- Hydrogen is considered the "fuel of the future".
- 36- The matchstick ignition when it rubs against a rough surface.
- 37- The burning candle goes out when covered with a glass bell.
- 38- Water is not used to extinguish petroleum fires
- 39- Drivers are always advised to use a seatbelt in cars.
- 40- A large truck loaded with goods is harder to park than a small car moving at the same speed.
- 41- Second class levers always save effort
- 42- Simple machines are very important in our lives.
- 43- The effort and load can be equal to the first type of levers only.
- 44- Third class levers do not always save effort.





- 45- Fixed pulley is a type of first-class lever.
- 46- Petals in many flowers are brightly colored and have a fragrant scent
- 47- Anthers hang outside the flowers of some plants that are pollinated by wind.
- 48- Pollen grains in insect-pollinated plants are sticky or rough.
- 49- The importance of the floral envelope in flowers such as the Narcissus flower.
- 50- Wind-pollinated plants produce pollen grains in very large numbers.
- 51- Sexual reproduction leads to genetic variation among offspring
- 52- The equality of chromosome numbers in somatic cells of different organisms does not mean they are genetically identical
- 53- Temperature is considered the most important climatic element.
- 54- Areas close to the Equator are characterized by high temperatures.
- 55- Temperature decreases as we rise above sea level.
- 56- The daily average temperature differs from one city to another.
- 57- Atmospheric pressure decreases with increasing altitude above sea level.
- 58- Temperature affects atmospheric pressure.
- 59- Temperature is affected by differences in lines of latitude.
- 60- Temperature is affected near water bodies.
- 61- The rate of influenza spread increases in winter.
- 62- The Stevenson screen is painted with white color.
- 63- The radiosonde balloon bursts when it reaches high altitudes.
- 64- The Stevenson screen is placed away from trees and buildings.
- 65- Weather forecasts are not absolute facts.
- 66- The importance of satellites in meteorology.
- 67- The Stevenson screen is raised 120 cm above ground level.



- 68- The presence of slanted openings in the walls of The Stevenson screen.
- 69- The radiosonde balloon is filled with helium or hydrogen gas.
- 70- Khamaseen winds have harmful health effects.
- 71- The accuracy of weather forecasts decreases as the time period increases.

#### **Q4: What happens when?**

- 1- Adding water to concentrated sulphuric acid.
- 2- Dropping concentrated sulphuric acid on the wall of container contains water.
- 3- Passing a stream of air over red-hot copper powder.
- 4- Passing a stream of hydrogen gas over black copper oxide with heating.
- 5- Extinguish sodium or potassium fires with water.
- 6- If no force affects on a stationary object
- 7- If a constant force affects on an object in relation to its acceleration of motion
- 8- A person pushing a heavy vehicle
- 9- Elastic collision between two objects
- 10- The collision of two objects is an inelastic collision
- 11- All the forces acting on an object moving at a constant speed stopped.
- 12- If the effective force increases when pushing a box on a smooth surface relative to the acceleration
- 13- If a small car collides with a big car with a low speed (in terms of kinetic energy)
- 14- If the driver presses the brakes of a car that is moving at a constant speed suddenly relative to the passengers
- 15- When a person jumps in a boat that is on the surface of the water
- 16- Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.
- 17- Increasing the bond energy in the reactant molecules relative to their ease of breakage.





- 18- A chemical reaction occurs in which the energy released during bond formation is "less" than the energy absorbed to break the bonds.
- 19- Adding aluminum powder to iron oxide (thermite reaction).
- 20- Decreased amount of oxygen during the combustion of a benzene flame.
- 21- Passing a stream of hydrogen over heated black copper oxide.
- 22- Add drops of glycerin to potassium permanganate powder.
- 23- Air is released from an inflated balloon on the left. (for the balloon movement).
- 24- The resulting force acting on an object if it is exerted by two forces of equal in magnitude and opposite in direction?
- 25- The distance covered by the truck to stop when the brakes are pressed if its load (mass) increases?
- 26- The speed of a car if it is exerted by a force in the same direction as its movement
- 27- Pulling quickly a tablecloth from under food plates?
- 28- The levers were not detected.
- 29- If the effort arm is longer than the load arm in the levers.
- 30- Anthers and stigmas do not mature at the same time
- 31- A pollen grain falls on the stigma of a flower of a different species
- 32- The gynoecium is removed from a typical flower before it blooms
- 33- We move closer to or farther away from the Equator?
- 34- Humidity increases (with respect to pressure)?
- 35- Temperature increases (with respect to pressure)?
- 36- The Earth stopped rotating?
- 37- Meteorological satellites disappeared?
- 38- Atmospheric pressure became equal between two cities?



### Q5: Compare between

1- instant cold compresses and instant hot compresses

Point of comparison (a) Dissolving substances b) Benefits)

2- The first, second and third class of levers in terms of: (definition - mentioning an example of each type-saving effort).

3- Somatic cells and reproductive (germ) cells.

4- Sexual reproduction and asexual reproduction.

5- Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.

6- Bisexual flowers and unisexual flowers.

7- Androecium and gynoecium in terms of structure and function.

8- Self-pollination and cross-pollination (definition and method).

9- Daily average temperature and daily temperature range.

10- Land breeze and sea breeze.

### Q6: Complete

1- The color of hydrated cobalt chloride is....., while the anhydrous cobalt chloride is.....

2- When the released energy from combination of solute with solvent is greater than the absorbed energy, the solubility is.....

3- Ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) is used in.... instant pressure compresses because its dissolution in water is an endothermic process.

4- Doubling the mass of the solute leads to ..... in the amount of change in the temperature of the solvent (water).

5- Substances that lower the temperature of water when dissolved (such as ammonium nitrate) are described as..... dissolving.

6- From Examples of ..... fuel such as oil and .....and... ....





- 7- .....is considered from Examples of biofuels and prepared from plants rich in..... such as corn.
- 8- .....Materials that have a low ignition point, while ..... materials that have a high ignition point.
- 9- ..... Flame is produced by the complete combustion of acetylene gas in present of excess oxygen, reaching a temperature of .....
- 10- The oxidizing agent undergoes a process of..... and the reducing agent undergoes a process of....
11. Newton's first law states that the object remains.....or in ... .. unless an external force affects on it.
12. Force is anything that is capable of changing..... of the object.
- 13- Newton's second law states that the resulting force exerted on an object is equal to ... .....x... ..
14. If the force acting on an object is zero, then ... .....of the body does not change.
15. Newton's third law states that for every action there is .....equal in ..... opposite in.....
16. When you push a ball on a flat surface, the value of the acceleration with which it moves depends on the affecting. ....and..... of the ball.
17. If the force acting on an object increases and its mass remains constant, the... .... of the object increases.
- 18- When you sit in a car that suddenly stops, your body leans forward due to... ..
- 19- Elastic collision is the collision that keeps both body's... ..... and body's ... ..
20. In elastic collision between two objects, the relative velocity of the two objects after the collision is.....their relative velocity before collision
21. In elastic collision, no constant..... occurs in colliding objects.
22. If two objects of equal mass collide with perfect elastic collision, their velocities..... after Collision
- 23- In inelastic collision, a loss of energy occurs in the form of ... .... Or.....



24- Air hockey is a fun game in which..... is used Circular in the push of... .... It slides on a smooth table with holes through which a constant stream of air rushes to reduce ..... between the disc and the table.

25- When balanced forces act on an object, the body... .....while when unbalanced forces affect the same body it... ..

26. Unit of force measurement is... .., the speed measurement unit is... .. while the acceleration measurement unit is... ..

27- If the resulting force is not equal to zero, so the force is... ..

28. It is recommended to wear a ... .. when driving a car

29- ..... allows the user to fly in the air upwards as the water rushes down through Its openings.

30- ... .. works by pushing air from the motors downwards, which is followed by pushing the air upwards with equal force.

31- In a chemical reaction, bond breaking is a..... is a process, while forming bonds is a .....process.

32- The reactions that are accompanied by the release of heat energy from the system to the surrounding medium are called..... reactions

33- In the energy diagram of the endothermic reaction, the energy of the products is..... the energy of the reactants.

34- The "thermite" reaction is used in..... and it is ..... reaction

35- The "conservation law of energy" states that energy does not.....or..... from nothing, but it can be converted from one form to another.

36- In a lemon battery .....energy stored in lemon juice is converted to ..... energy

37- Atmospheric air is composed of nitrogen gas by .....% and Oxygen gas by.....%.

38- Ethanol is a..... fuel, while hydrogen is a.....fuel.

39- The process that leads to an increase in the oxygen content of a substance is called ..... process.

40- The substance that removes oxygen or gives hydrogen is called the ..... factor





- 41- The temperature of the "oxyacetylene" flame reaches.....°C, used in cutting.....
- 42- The amount of force is measured in a unit called....., while the acceleration is measured in units of.....
- 43- The law that explains that an object remains as it is in terms of rest or motion unless it is affected by a force is called the law of.....
- 44- In the..... collision, there is no loss of energy, and the velocity is transferred from the moving object to the stationary object completely.
- 45- The mathematical formula for Newton's second law is:  $(F) = \dots\dots\dots \times \dots\dots\dots$
46. Every action has an equal reaction in..... and opposite in .....
- 47- The property of the body's resistance to changing its dynamic state is known as .....
- 48- Levers make tasks easier by..... and.....
- 49- The crowbar is a ..... class lever, while the manual broom is a..... class lever
- 50- The lever is in a state of equilibrium when the moment of the effort and the moment of load are.....
- 51- A machine saves effort when its mechanical advantage value is greater than.....
- 52- Increasing the length of the effort arm leads to .....
- 53- Second class levers are different from third class levers in .....
- 54- Examples of levers that increase speed ... ..
- 55- First class levers save effort when..... is longer than .....
- 56- The effort arm equals the load arm in ..... levers.
- 57- The most common type of levers is the .....class.
- 58- If the applied effort is half the load value and the load arm is 50 cm, then the effort arm equals..... cm.
- 59- After fertilization, the ovary develops into a ..... while the ovules develop into ....
- 60- The floral whorl that protects the inner parts of the flower before blooming is the....



61- Examples of unisexual flowers are the ... ..... plant and the ..... plant.

62- Winds are deflected to the right in the ..... Hemisphere.

63- A low-pressure area is represented by the symbol..... and the color

64- Air moves from areas of ..... pressure to areas of ..... pressure.

65- The deflection of winds caused by Earth's rotation is called the..... effect.

66- At the equator, wind paths are.....

67- Air currents in a low-pressure area are ..... leading to cloud formation.

68- Air currents in a high-pressure area ..... leading to dry and clear weather.

### **Q7: What is meant by?**

- 1- The fuel
- 2- Ignition point
- 3- Oxidization
- 4- Reduction
- 5- The oxidizing agent
- 6- The reducing agent
- 7- Winds.
- 8- Coriolis effect.
- 9- Isobars.
- 10- Low-pressure system (L).
- 11- The Weather Kiosk (Stevenson's Kiosk).
- 12- Weather forecasting.
- 13- Radiosonde.
- 14- Meteorological buoys.
- 15- High-pressure system.
- 16- Khamaseen winds.
- 17- What is meant by a cancerous tumor?





### Q8: What is the importance of

- 1- The fuel
- 2- Using the sand or foam to extinguish some fires
- 3- Oxyacetylene flame
- 4- Evacuating air from preservation bags when preserving food in them.
- 5- Fire extinguishers
- 6- Spark plugs
- 7- Lever:
- 8- Forceps:
- 9- Crowbar:
- 10- What is the importance of mitosis in humans?
- 11- What is the importance of meiosis in humans?

### Q9: Problems

- 1- A person pulled a 10 kg block box with a force of 50 N on a horizontal frictionless surface. How much acceleration does the box move?
- 2- An object with a mass of 15 kg is placed on the ground. How much force is needed to lift it vertically? (Note that the acceleration of gravity =  $10 \text{ m/s}^2$ )
- 3- **A type** of first class lever had a force of 40 N and a effort arm of 5 cm. It affected a load of 100 N. Calculate the length of the load arm? Does the lever save effort or not?
- 4- **Imagine** trying to break a hard hazelnut shell and you have to choose between two similar crushers, one of which has a longer hand than the other. Determine: What kind of levers is the nutcracker? And how does it work? Which two crushers will you use? Where do you put the hazelnut for the arms?
- 5- **Imagine** trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum. (Explain your answer with a drawing).
  - 1-What type of levers will be used?
  - 2-Will you choose a long or short column to get the job done?
  - 3-Where will you put the small stone in relation to the huge rock?
- 6- **A lever** affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.
  - 1-Is this lever balanced? and why?



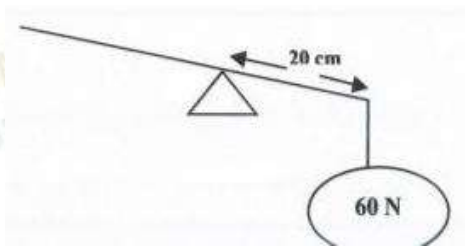
2- If the lever is unbalanced, what is the length of the load arm that achieves balance?

7- Using the following table, find the value of x, y and state the law of levers.

| Effort (Newton) | Effort Arm (cm) | Load (Newton) | Load Arm (cm) |
|-----------------|-----------------|---------------|---------------|
| X               | 5               | 1             | 10            |
| 4               | 5               | 2             | Y             |

8- In the corresponding figure:

On what dimension of the fulcrum does a load of 30 N is hanged, to balance the lever?



### Q10: Practical Questions

- 1- If a light ball is replaced by another heavy one, which ball will be affected more? Why?
- 2- A person pushes the wall, why doesn't the wall move despite pushing?
- 3- A car moving at a constant speed on a straight road Which law explains this?
- 4- When jumping out of the boat, the boat moves backwards Which law makes this clear?

### Q11: Write the scientific term

1. A fixed point on which a rigid bar rests
2. Levers where the fulcrum between effort and load.
3. Levers where the effort is between the load and the fulcrum point.
4. Levers where the load is between the effort and the fulcrum point.
5. The distance between the weight representing the load and the fulcrum point.
6. Specialized cells responsible for sexual reproduction in living organisms.





7. Reproduction that occurs through two parent individuals of the same species, one male and the other female.
8. The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote that carries the full number of chromosomes (2n).
9. The transfer of pollen grains from the anthers of a flower to the stigmas of another flower on a different plant of the same species.
10. A short stem whose leaves are modified to carry out reproduction in the plant.
11. A cell formed by the fusion of the egg nucleus, containing (2N) chromosomes.
12. The unit of structure and function in living organisms.
13. A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction.
14. The male reproductive organ in the flower, consisting of several stamens.
15. The state of the atmosphere at a specific place over a short period of time.
16. The prevailing state of the atmosphere at a specific place over a long period of time.
17. The highest temperature in one day.
18. The lowest temperature in one day.
19. The weight of a column of air with a cross-sectional area of 1 m<sup>2</sup> and a height equal to the height of the atmosphere.
20. The amount of water vapor present in the air.
21. The actual mass of water vapor present in a given volume of atmospheric air.
22. Predicting future weather conditions in a certain place.
23. A white wooden box with slanted openings that protects temperature-measuring instruments.
24. A device is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere.
25. Buoys used to collect data in oceans and transmit it via satellites.
26. Satellites that rotate around the Earth to provide comprehensive weather images and data.
27. Seasonal winds in Egypt carrying sand and dust and affecting health.
28. A gas used in radiosonde balloons because of its light weight.
29. The symbol used on maps to represent "thunder and lightning."
30. The symbol used to represent "snowfall."
31. The altitude at which the radiosonde balloon bursts (in kilometers).



**Q12: Choose the odd word out, and then state the relationship between the remaining ones:**

1. Zucchini - Date palm - Tomato – Maize
2. Stigma - Style - Ovary – Filament

**Q13: Put (✓) or (X)**

1. Winds move in completely straight paths from the poles to the equator.
2. Wind speed increases when the difference in atmospheric pressure is large.
3. In the Northern Hemisphere, winds rotate around the center of a low-pressure system anticlockwise direction.
4. Cold, moist air in polar regions forms a high-pressure area.
5. The Coriolis effect is responsible for winds moving in curved paths.
6. Lines of equal pressure are called isobars.
7. At the center of a low-pressure system, pressure values are higher than in surrounding areas.





**Q1: Choose the correct answer from the given answers:**

1- The correct definition of endothermic dissolution is.....

(a) A process in which thermal energy is absorbed from the surrounding environment.

(a) A process in which thermal energy is absorbed from the surrounding environment.

(b) A process in which no exchange of thermal energy occurs.

(C) A process in which chemical energy is converted into thermal energy.

(d) A process in which thermal energy is released into the surrounding environment.

2- A common example of endothermic dissolution is

(b) Dissolving ( $\text{NH}_4\text{NO}_3$ ) in water.

(a) The dissolution of sodium carbonate.

(b) Dissolving ( $\text{NH}_4\text{NO}_3$ ) in water.

(C) The dissolution of sodium hydroxide.

(d) The dissolution of calcium chloride.

3- A common example of exothermic dissolution is.....

(C) Dissolving sodium hydroxide.

(a) Dissolving potassium sulphate.

(b) Dissolving ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) in water.

(C) Dissolving sodium hydroxide.

(d) Dissolving  $\text{NaHCO}_3$

4- When instant cold compresses are used, they work by..... the blood vessels in the affected area, which leads to reduced blood flow and reduced swelling.

(b) narrowing.

Widening (b) narrowing (C) Heating (d) Dissolving

5- .....Raise the temperature of the water when dissolved in it.

(C) Sodium hydroxide.

(a) Ammonium nitrate

(b) Potassium chloride

(C) Sodium hydroxide.



(d) Hydrated copper sulfate.

6- In exothermic reactions, the final temperature ( $T_2$ ) is..... the initial temperature ( $T_1$ )

(b) higher than.

a) Lower than    b) higher than    c) equal to    d) half

7- When a magnesium strip reacts with diluted hydrochloric acid, heat is transferred from ...

(b) The system to the surrounding medium.

a) The surrounding medium to the system

b) The system to the surrounding medium

c) The products to the reactants

d) The beaker to the thermometer only

8- Which of the following reactions is an example of an endothermic reaction?

(c) Barium hydroxide reacting with ammonium chloride.

a) Magnesium reacting with hydrochloric acid

b) Calcium oxide reacting with water

c) Barium hydroxide reacting with ammonium chloride

d) Thermite reaction

9- The German scientist who proved that energy cannot be created or destroyed is:

(c) Hermann von Helmholtz.

a) Einstein

b) Newton

c) Hermann von Helmholtz

d) Dalton

10- The process of breaking the bonds between atoms in reacting substances is:

(b) endothermic.

a) Exothermic

b) endothermic

c) Not accompanied by heat change

d) produces electrical energy





**11-** In the energy diagram of an exothermic the energy level of the products is .....  
(b) lower than.

the energy level of the reactants

- a) Higher than
- b) lower than
- c) equal to
- d) parallel to

**12-** The substance..... is used in self-heating packages.

(b) Calcium oxide (quicklime).

- a) Ammonium chloride
- b) Calcium oxide (quicklime)
- c) Sodium bicarbonate
- d) Ammonium nitrate

**13-** The substance responsible for the "refreshing sensation" (coolness) when eating fizzy sweets is.....

(c) A mixture of sodium bicarbonate and citric acid.

- a) Citric acid only
- b) Glucose
- c) A mixture of sodium bicarbonate and citric acid
- d) Iron oxide

**14-** The thermite reaction is used in.....

(b) welding railroad tracks.

- a) Cooling drinks
- b) welding railroad tracks
- c) Making lemon batteries
- d) making candy



**15-** If the energy released when bonds are formed is greater than the energy absorbed when bonds are broken, the reaction is.....

**(b) Exothermic.**

- a) Endothermic
- b) Exothermic
- c) Thermally neutral
- d) Balanced

**16-** In the lemon battery experiment, energy is converted from..... energy to electrical energy.

**(c) chemical energy.**

- a) Thermal
- b) kinetic
- c) chemical
- d) light

**17-** When ammonium chloride powder is added to barium hydroxide and the mixture is stirred, we observe.....

**(c) The temperature of the beaker drops and a layer of frozen water forms.**

- a) The temperature of the beaker rises.
- b) The mixture ignites.
- c) The temperature of the beaker drops and a layer of frozen water forms.
- d) No change occurs.

**18-** Examples of endothermic reactions in everyday life include.....

**(a) The thermal decomposition of limestone.**

- a) The thermal decomposition of limestone
- b) The thermite reaction
- c) Fuel combustion
- d) Respiration in living organisms





**19-** In an endothermic reaction, the value of the change in heat content is.....

(b) positive.

- a) Negative
- b) positive
- c) zero
- d) variable

**20-** Any of the following processes is accompanied by a decrease in the temperature of the solution.....

(b) The dissolution of ammonium nitrate in water.

- a) Solubility of sodium hydroxide in water.
- b) The dissolution of ammonium nitrate in water.
- c) Condensation of water vapor.
- d) Dissolving the washing powder in water.

**21-** The thermal change resulting from the melting of a certain amount of solute in a known volume of solvent to form a solution is called.....

(c) Heat of dissolution.

- a) Activation energy.
- c) Heat of dissolution.
- b) enthalpy of the material.
- d) Specific heat.

**22-** Which of the following material transformations is considered "exothermic"?.....

(d) Freezing.

- a) Fusion.
- b) Evaporation.
- c) Sublimation.
- d) Freezing.



**23-** In the lithium chloride solubility experiment, if the initial temperature  $T_1 = 21^\circ\text{C}$  and the final temperature  $T_2 = 25.5^\circ\text{C}$  when dissolved 1g

(b)  $9^\circ\text{C}$ .

What is the amount of temperature change  $T$  when dissolve 2g in the same amount of water

- a)  $4.5^\circ\text{C}$
- b)  $9^\circ\text{C}$
- c)  $5.31^\circ\text{C}$
- d)  $52.2^\circ\text{C}$

**24-** Ammonium nitrate is used in the manufacture of cold compresses because of its solubility in water.....

(c) It absorbs heat energy from the surrounding medium (endothermic).

- a) Raises the temperature of the water (exothermic).
- b) Reduces blood flow to the affected area.
- c) It absorbs heat energy from the surrounding medium (endothermic).
- d) Causes instant boiling of water.

**25-** When a crystalline (hydrated) salt such as  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is dissolved in water, the color turns into.....

(d) The color does not change.

- a) White.
- b) Pink.
- c) Blue.
- d) The color does not change.

**26-** In the cooling cycle inside the refrigerator at any stage the heat is "absorbed" from the food.....

(b) While the coolant is expanding and evaporating inside the refrigerator.

- a) During the process of compressing the gas by the motor.
- b) While the coolant is expanding and evaporating inside the refrigerator.
- c) While the gas is condensing in the grid behind the refrigerator.
- d) During the transfer of heat to the surrounding medium (air).



**27-** When an exothermic reaction occurs, heat energy is transferred from.....

**(b) The system to the surrounding medium.**

- a) the surrounding medium to the system.
- b) The system to the surrounding medium.
- c) Thermometer to cup.
- d) Atmospheric air to reactants.

**28-** The combustion process is based on 3 basic elements called "fire represented". Which of the following represents these elements.....

**(b) Fuel, oxygen gas, heat.**

- a) Fuel, nitrogen gas, heat.
- b) Fuel, oxygen gas, heat.
- c) Carbon dioxide, fuel, oxygen.
- d) Water, heat, oxygen.

**29-** It is completely forbidden to use water to extinguish sodium or potassium fires in laboratories.....

**(c) Because the reaction with water is highly exothermic and leads to the ignition of the rising hydrogen gas.**

- a) Because water evaporates quickly.
- b) Because water freezes when it comes into contact with these metals.
- c) Because the reaction with water is highly exothermic and leads to the ignition of the rising hydrogen gas.
- d) Because the density of water is less than that of sodium.

**30-** If matter (X) has a degree of ignition of  $45^{\circ}\text{C}$  and matter (Y) has a degree of ignition of  $300^{\circ}\text{C}$ . Which of the following statements is correct?

**(c) Matter X ignites faster than Matter Y because it has a lower degree of ignition.**

- a) Matter (Y) ignites faster than substance (X).
- b) Material X is safer to store than Material Y.
- c) Matter X ignites faster than Matter Y because it has a lower degree of ignition.
- d) The two substances ignite at the same time.





**31-** When the amount of oxygen is abundant (too sufficient) in a gasoline stove, the flame appears in ..... color.

**(c) Blue (complete combustion).**

- a) Yellow.
- b) Red.
- c) Blue (complete combustion).
- d) Orange.

**32-** A small percentage of ethanethiol gas is added to the natural gas used in households

**(c) To facilitate the detection of gas leaks due to its characteristic garlic-like smell.**

- a) To raise the calorific value of natural gas when it is combusted.
- b) to act as a catalyst that increases the speed of natural gas combustion.
- c) To facilitate the detection of gas leaks due to its characteristic garlic-like smell.
- d) To reduce carbon dioxide emissions from combustion.

**33-** When a stream of hydrogen gas is passed over the heated black copper oxide powder.....

**(c) Hydrogen oxide is formed and the powder turns into red copper.**

- a) The tube explodes due to the rise of oxygen gas.
- b) No reaction occurs because hydrogen is an inert gas.
- c) Hydrogen oxide is formed and the powder turns into red copper.
- d) The color of the powder changes from black to white.

**34-** Ethanol prepared from cornstarch is a ..... fuel, while hydrogen is a ..... fuel.

**(c) Biologically/Artificially.**

- a) Artificially/Biologically
- b) Fossil / Naturally
- c) Biologically/Artificially
- d) Solid/Liquid



35- ..... is the substance that gives oxygen during a chemical reaction."

(d) Oxidizing agent.

- a) Combustible material
- b) Catalyst
- c) Biofuel
- d) Oxidizing agent

36- Water is not used to extinguish oil fires because.....

(a) The density of oil is lower than that of water, so it floats on its surface and remains burning.

- a) The density of oil is lower than that of water, so it floats on its surface and remains burning.
- b) The water cools the petroleum quickly, causing it to freeze.
- c) Water chemically reacts with petroleum and produces toxic gases.
- d) Water hydrolyses by heat into oxygen that increases the ignition of a fire.

**Q2: Correct the following statements:**

1- In exothermic reactions, the final temperature T2 is **lower** than the initial temperature T1.

higher than

2- The  $\text{CaCO}_3$  decomposition reaction is an example of **exothermic** reactions.

endothermic

3- The **less** energy the bond, the harder it is to break.

The more

4- In an endothermic reaction, the system absorbs heat energy that causes the **increase** in the temperature of the surrounding medium

decrease

5- Self-heating packaging is based on the reaction of calcium oxide with water, which is an **endothermic** reaction.

exothermic reaction.

6- Natural gas is mainly made up of **propane** gas

methane gas.



7- Oxidation is a process that results in a **lack** of oxygen in a material.

increase

8- A **reducing agent** is defined as the substance that gives oxygen during a reaction.

An oxidizing agent

9- The calorific value of wood is **higher** than the calorific value of hydrogen.

lower

10- The acceleration with which the object moves **increases** as its mass increases when the force is constant.

decreases

11- The forces of action and reaction affect on the **same body** and therefore do not cancel each other out.

two different bodies

12- Newton's **second law** is known as the law of inertia.

Newton's first law.

13- If two forces of equal magnitude and opposite in direction act along same line of action, the resultant is the **sum** of the two forces.

Difference

14- Mass is considered a **vector** physical quantity.

scalar

15- Mitosis is known as reduction division. **Equational**

16- Asexual reproduction depends on meiosis. **Mitosis**

17- The first meiotic division is a mitotic division. **Second**

18- Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals. **Sexual**

19- After the second meiotic division, two cells are produced containing half the original number of chromosomes (n). **four**

20- A bottle opener is a first-class lever. **Second**

21- One function of levers is decreasing force as in the hand broom. **Increasing**





22- First-class levers differ from second-class levers in the presence of an applied force. **Fulcrum**

23- A fishing rod is a second-class lever. **Third**

24- Vegetative reproduction is a form of sexual reproduction. **Asexual**

25- Gamete cells contain the full number of chromosomes found in somatic cells.  
**Half**

**Q3: Give reason for each of the following:**

1- We feel cold when washing our hands with antiseptic hand gel

Because heat is absorbed from the hands as the alcohol in the hand gel evaporates, the process is endothermic.

2- We feel the warmth of our hands when the laundry powder dissolves in water.

Because heat is released when the washing powder dissolves in water, so the process is exothermic.

3- Special precautions must be taken when diluting concentrated acids by adding the acid to water, not the other way around.

Because the dilution of concentrated acids is exothermic, acid must be added slowly to water to absorb the released heat to avoid splashing.

4- Instant Hot packs (using magnesium sulfate) are used to relieve pain associated with muscle strain

Because they expand blood vessels, increasing blood flow to stressed areas, relaxing contracted muscles and relieving pain.

5- The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.

Because as the mass of solutes increases the change in temperature increases

6- You feel a cooling sensation in your mouth when you eat fizzy candy containing sodium bicarbonate.

Because the mixture of sodium bicarbonate and citric acid absorbs heat from mouth causes a cooling sensation due to an endothermic process.



7- The reaction of magnesium with hydrochloric acid is an exothermic reaction. Because the reaction releases heat energy to the surrounding medium, raising the temperature.

8- Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.

Because the reaction absorbs heat energy, cooling the surroundings and decreasing temperature so the water freezes.

9- The process of breaking bonds is endothermic, while the formation of bonds is exothermic.

Because bond breaking absorbs energy, while bond formation releases energy.

10- The difference in heat content between reactants and products in chemical reactions.

Because energy is stored in the bonds between atoms of reactants and products, and the amounts of energy absorbed in bond breaking and released in bond formation are not equal.

11- A reaction is called exothermic if the energy released during bond formation is greater than the energy absorbed during bond breaking.

Because the energy released during bond formation is greater than the energy absorbed during bond breaking.

12- Scientists resort to using self-heating containers in expeditions or military applications.

Because they provide heat without the need for an external heat source by the exothermic reaction of water and CaO

13- Fireflies are called by this name (in relation to energy transformations).

Because exothermic chemical reactions inside their bodies convert chemical energy to light energy (not heat).

14- A small ratio of ethanethiol gas added to both natural gas and the Buta-gas (Liquefied Petroleum Gas)

Because natural gas and butagas are odourless gases, so ethanethiol is added to detect leaks by its garlic-like smell.



**15-** Benzene flame that used in laboratories sometimes appears yellow and sometimes blue

Because the flame colour depends on the amount of oxygen mixed with the fuel: blue with abundant oxygen and yellow with limited oxygen.

**16-** Spark plugs are used in car engines

Because spark plugs produce a spark that ignites the mixture of gasoline and air in the combustion chamber.

**17-** Oxyacetylene flame is used in cutting or welding metals

Because its temperature reaches 3000 C so it is suitable for cutting or welding metals

**18-** Black copper oxide is reduced when a stream of hydrogen gas passed over it.

Because it gives oxygen to hydrogen during the chemical reaction so it is reduced to copper CU

**19-** Food can be preserved by evacuating air from preservation bags.

Because removing air creates a poor-oxygen environment that minimizes redox reactions causing food spoilage.

**20-** The stationary body remains stationary if it is not affected by force.

Due to newton's first law, the object keeps its state unless it is affected by external unbalanced force

**21-** An object moving at a constant speed on a straight line that does not stop on its own

Due to newton's first law (inertia law), the object keeps its state unless it is affected by external unbalanced force

**22-** Water spilling from the cup if the cup is moved suddenly

Because the inertia of the water causes it to resist the sudden movement of the cup.

**23-** Pushing of an empty cart requires less force than pushing a full cart

Because the empty cart has less mass and therefore less inertia.

**24-** Increasing the acceleration when greater the force exerted on the body

Because according to Newton's second law, acceleration is directly proportional to the net force, so it increases by increasing the force





**25-** The balloon filled with air bounces when it is released

According to newton's third law, for every action there is a reaction equal in magnitude and opposite in direction

**26-** The boat moves backwards when you jump from it towards the shore

According to newton's third law, for every action there is a reaction equal in magnitude and opposite in direction

**27-** A moving ball stops when it hits a wall

Due to newton's first law, the wall acts on the ball with a force in opposite direction

**28-** A ball bounces from another ball when it collides

According to newton's third law, for every action there is a reaction equal in magnitude and opposite in direction

**29-** The speed of an object changes after a collision with another object.

Because the collision exerts a force that changes the object's velocity.

**30-** In elastic collisions, there is no loss of kinetic energy.

Because the moving object stops while static object moves so all the kinetic energy are transferred from the first to the second object

**31-** In inelastic collisions, there is a loss of kinetic energy

Because part of the kinetic energy is converted into other forms such as heat, sound, or deformation.

**32-** The reaction of magnesium with hydrochloric acid is called an exothermic reaction.

Because it is accompanied by the release of heat energy to the surrounding medium.

**33-** Cooling of the surrounding medium in endothermic reactions.

Because the system absorbs heat from the surrounding medium, so the surrounding medium cools down.

**34-** The elements (fuel, oxygen, heat) are called the triangle of fire.

Because fuel, oxygen, and heat are the three basic elements needed for combustion.

**35-** Hydrogen is considered the "fuel of the future".

Because hydrogen has a very high calorific value (high amount of energy) and can be used as a clean fuel in fuel cells.



**36-** The matchstick ignition when it rubs against a rough surface.

Because friction with the rough surface produces the heat needed to reach the ignition point.

**37-** The burning candle goes out when covered with a glass bell.

Because the oxygen inside the bell jar is consumed, so the fire triangle becomes incomplete.

**38-** Water is not used to extinguish petroleum fires

Because oil floats on the surface of water due to its lower density, so the fire spreads instead of being extinguished.

**39-** Drivers are always advised to use a seatbelt in cars.

Because the seat belt reduces (inertia) or the rushing forward of the driver during sudden stopping.

**40-** A large truck loaded with goods is harder to park than a small car moving at the same speed.

Because the truck has greater mass, so it has greater inertia and is harder to stop.

**41-** Second class levers always save effort

Because the effort arm is longer than the load arm

**42-** Simple machines are very important in our lives.

Because it saves time and effort in performing tasks

**43-** The effort and load can be equal to the first type of levers only.

When the effort arm equals to the load arm

**44-** Third class levers do not always save effort.

When the effort arm is shorter than load arm

**45-** Fixed pulley is a type of first-class lever.

Because the fulcrum is in the middle between effort and load forces

**46-** Petals in many flowers are brightly colored and have a fragrant scent

To attract insects that help in pollination



47- Anthers hang outside the flowers of some plants that are pollinated by wind.

To facilitate their opening by wind

48- Pollen grains in insect-pollinated plants are sticky or rough.

To stick with insect body

49- The importance of the floral envelope in flowers such as the Narcissus flower.

To protect the reproductive organs and attract the insects that help in pollination

50- Wind-pollinated plants produce pollen grains in very large numbers.

To compensate the lost pollen grains in air

51- Sexual reproduction leads to genetic variation among offspring

Due to crossing over phenomena which occurs in meiotic division

52- The equality of chromosome numbers in somatic cells of different organisms does not mean they are genetically identical

Because they carry different genetic information

53- Temperature is considered the most important climatic element.

Because it affects human life and distribution of plants and animals on different areas

54- Areas close to the Equator are characterized by high temperatures.

Because the sun rays fall perpendicular on this area

55- Temperature decreases as we rise above sea level.

As we go up air expands and density decreases

56- The daily average temperature differs from one city to another.

Due to difference in maximum and minimum temperature from one city to another according to the height and water bodies

57- Atmospheric pressure decreases with increasing altitude above sea level.

As we go up the weight of air column decreases





**58-** Temperature affects atmospheric pressure.

when temperature increases, air expands, density decreases, so atmospheric pressure decreases.

**59-** Temperature is affected by differences in lines of latitude.

Because sun rays fall perpendicular on equator give it high effect of heat and as we go away from equator inclination of sunrays increases causes decreasing in temperature

**60-** Temperature is affected near water bodies.

Due to the difference in the specific heat of water and land

**61-** The rate of influenza spread increases in winter.

Due to low humidity of cold air causes rapid evaporation of respiratory droplets carrying virus allow them to remain suspend in air for long time

**62-** The Stevenson screen is painted with white color.

to reflect sunlight

**63-** The radiosonde balloon bursts when it reaches high altitudes.

As a result of its expansion due to decrease pressure at high altitude

**64-** The Stevenson screen is placed away from trees and buildings.

To avoid any obstacles that may affect measurement

**65-** Weather forecasts are not absolute facts.

Due to unexpected weather changes

**66-** The importance of satellites in meteorology.

Provide real time, global data for weather forecasting and climate monitoring, track storm and collect data about weather elements

**67-** The Stevenson screen is raised 120 cm above ground level.

To protect instruments in it from heat radiated from Earth's surface

**68-** The presence of slanted openings in the walls of The Stevenson screen.

To allow air circulation



69- The radiosonde balloon is filled with helium or hydrogen gas.

Due to their low density

70- Khamaseen winds have harmful health effects.

because they are loaded with sand and dust

71- The accuracy of weather forecasts decreases as the time period increases.

Because the atmosphere is affected by large number of variables

#### **Q4: What happens when?**

1- Adding water to concentrated sulphuric acid.

exothermic reaction occurs and large amount of heat released causing boiling of water and splashing of acid

2- Dropping concentrated sulphuric acid on the wall of container contains water.

The acid mixes gradually with water, and the water absorbs the released heat, reducing splashing

3- Passing a stream of air over red-hot copper powder.

The red-hot copper powder combines with oxygen and turns into black copper oxide (Oxidation)

4- Passing a stream of hydrogen gas over black copper oxide with heating.

Hydrogen takes oxygen and form water (oxidation) while CuO gives oxygen and becomes copper CU (reduction)

5- Extinguish sodium or potassium fires with water.

The fire becomes more intense because the reaction with water is highly exothermic and the released hydrogen ignites.

6- If no force affects on a stationary object

It remains stationary.

7- If a constant force affects on an object in relation to its acceleration of motion

The object moves with constant acceleration in the same direction as the force.

8- A person pushing a heavy vehicle

it will move slowly because the vehicle has a large mass, and the relation between the mass and acceleration is inverse relationship



**9-** Elastic collision between two objects

No kinetic energy loss, static object will move while moving object will stop

**10-** The collision of two objects is an inelastic collision

There is a loss of kinetic energy in the form of heat, sound, or deformation.

**11-** All the forces acting on an object moving at a constant speed stopped.

It continues moving at a constant speed in a straight line.

**12-** If the effective force increases when pushing a box on a smooth surface relative to the acceleration

The acceleration increases.

**13-** If a small car collides with a big car with a low speed (in terms of kinetic energy)

there will be loss of some of the kinetic energy in the form of heat, sound or deformation

**14-** If the driver presses the brakes of a car that is moving at a constant speed suddenly relative to the passengers

The passengers rush forward because of inertia.

**15-** When a person jumps in a boat that is on the surface of the water

The boat moves backward.

**16-** Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.

The LED bulb lights up as chemical energy is converted into electrical energy.

**17-** Increasing the bond energy in the reactant molecules relative to their ease of breakage.

It becomes more difficult to break the bonds.

**18-** A chemical reaction occurs in which the energy released during bond formation is "less" than the energy absorbed to break the bonds.

The reaction is endothermic and absorbs heat from the surrounding medium.

**19-** Adding aluminum powder to iron oxide (thermite reaction).

Exothermic reaction occurs releasing heat that melts iron to be used in welding of railroad tracks





20- Decreased amount of oxygen during the combustion of a benzene flame.

The flame becomes yellow due to incomplete combustion.

21- Passing a stream of hydrogen over heated black copper oxide.

water ( $H_2O$ ) is formed and the black copper oxide changes to red copper.

22- Add drops of glycerin to potassium permanganate powder.

A spontaneous exothermic reaction occurs, producing smoke and a purple-coloured flame.

23- Air is released from an inflated balloon on the left. (for the balloon movement).

The balloon moves to the right, opposite to the air.

24- The resulting force acting on an object if it is exerted by two forces of equal in magnitude and opposite in direction?

The resultant force is zero.

25- The distance covered by the truck to stop when the brakes are pressed if its load (mass) increases?

The stopping distance increases.

26- The speed of a car if it is exerted by a force in the same direction as its movement

The speed of the car increases.

27- Pulling quickly a tablecloth from under food plates?

The food plates remain in their place because of inertia.

28- The levers were not detected.

We can't make tasks easier

29- If the effort arm is longer than the load arm in the levers.

The lever saves effort

30- Anthers and stigmas do not mature at the same time

Cross pollination occurs

31- A pollen grain falls on the stigma of a flower of a different species

Pollination and Fertilization wouldn't occur

32- The gynoecium is removed from a typical flower before it blooms

Fertilization does not occur in that flower, so fruit and seeds are not formed.



33- We move closer to or farther away from the Equator?

The temperature increase and pressure decrease near the equator and vice versa

34- Humidity increases (with respect to pressure)?

Pressure decreases

35- Temperature increases (with respect to pressure)?

Pressure decreases

36- The Earth stopped rotating?

Coriolis effect won't happen, wind moves in straight line

37- Meteorological satellites disappeared?

Weather forecasting become inaccurate

38- Atmospheric pressure became equal between two cities?

Wind blowing between them will stop

### Q5: Compare between

#### 1- instant cold compresses and instant hot compresses

Point of comparison

a) Dissolving substances

Instant cold compresses: dissolving ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) in water (endothermic dissolution).

Instant hot compresses: dissolving magnesium sulfate ( $\text{MgSO}_4$ ) in water (exothermic dissolution).

b) Benefits

Instant cold compresses: reduce swelling by narrowing blood vessels and reducing blood flow.

Instant hot compresses: relieve pain associated with muscle strain by expanding blood vessels and increasing blood flow.



**2-** The first, second and third class of levers in terms of: (definition - mentioning an example of each type-saving effort).

|               | First class lever                                              | Second class lever                                             | Third class lever                                              |
|---------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| Definition    | Levers that have fulcrum in the middle between effort and load | Levers that have load in the middle between effort and fulcrum | Levers that have effort in the middle between load and fulcrum |
| Example       | Seesaw                                                         | Wheel barrow                                                   | Broom                                                          |
| Saving effort | Some of it save while other don't save                         | Save effort                                                    | Doesn't save effort                                            |

**3-** Somatic cells and reproductive (germ) cells.

Somatic cells: all cells of living organisms except reproductive cells.

Reproductive cells: Specialized cells responsible for sexual reproduction in living organisms.

**4-** Sexual reproduction and asexual reproduction.

Sexual reproduction : vital process in which two parental individuals of same species one is male and the other female participate to produce new individuals carry combination of genetic traits of both parents

Asexual reproduction : vital process in which a parental individual produce new individuals completely identical in genetic traits

**5-** Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.

Wind-pollinated flowers: dry, smooth and light

Insect-pollinated flowers: rough or sticky





## 6- Bisexual flowers and unisexual flowers.

Bisexual flowers contain 4 floral whorls, both male and female organs such as tomato

Unisexual flowers contain 3 floral whorls, male or female organ only such as maize

## 7- Androecium and gynoecium in terms of structure and function.

### Androecium

### gynoecium

|                                                                     |                                                                         |
|---------------------------------------------------------------------|-------------------------------------------------------------------------|
| consists of stamens and each stamen consists of filament and anther | consists of carpels and each carpel consists of ovary, style and stigma |
| Production of pollen grains                                         | Production of ovules                                                    |

## 8- Self-pollination and cross-pollination (definition and method).

Self-pollination: the process of transfer of pollen grains from the anther of a flower to the stigma of the same flower or the stigma of another flower in the same plant

Cross -pollination: the process of transfer of pollen grains from the anther of a flower in a plant to the stigma of another flower in another plant of the same species

## 9- Daily average temperature and daily temperature range.

Daily average temperature: the arithmetic mean of the maximum and minimum temperature of one day

Daily temperature range: the difference between the maximum and minimum temperature of one day

## 10- Land breeze and sea breeze.

Land breeze: the air above the sea at night is warmer than the air above the land so the warm air rises above the sea and replaced by cool air from the land

Sea breeze: the air above the land at daytime is hotter than the air above the sea so the warm air rises above the land and replaced by cool air from the sea



### Q6: Complete

1- The color of hydrated cobalt chloride is....., while the anhydrous cobalt chloride is.....

pink, blue.

2- When the released energy from combination of solute with solvent is greater than the absorbed energy, the solubility is.....

exothermic.

3- Ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) is used in..... instant pressure compresses because its dissolution in water is an endothermic process.

cold.

4- Doubling the mass of the solute leads to ..... in the amount of change in the temperature of the solvent (water).

doubling (with a constant change).

5- Substances that lower the temperature of water when dissolved (such as ammonium nitrate) are described as..... dissolving.

endothermic.

6- From Examples of ..... fuel such as oil and .....and... ..

fossil, coal, natural gas.

7- .....is considered from Examples of biofuels and prepared from plants rich in..... such as corn.

Ethanol, starch.

8- .....Materials that have a low ignition point, while ..... materials that have a high ignition point.

more flammable, less flammable.

9- ..... Flame is produced by the complete combustion of acetylene gas in present of excess oxygen, reaching a temperature of .....

Oxyacetylene,  $3000^\circ\text{C}$ .

10- The oxidizing agent undergoes a process of..... and the reducing agent undergoes a process of....

reduction, oxidation.



**11-** Newton's first law states that the object remains.....or in ... .... unless an external force affects on it.

at rest, motion

**12-** Force is anything that is capable of changing..... of the object.

the state.

**13-** Newton's second law states that the resulting force exerted on an object is equal to ... .....x... ..

mass  $\times$  acceleration.

**14-** If the force acting on an object is zero, then ... .....of the body does not change.

the state

**15-** Newton's third law states that for every action there is .....equal in ..... opposite in.....

reaction, magnitude, direction.

**16-** When you push a ball on a flat surface, the value of the acceleration with which it moves depends on the affecting. ....and..... of the ball.

net force, mass.

**17-** If the force acting on an object increases and its mass remains constant, the... .... of the object increases.

acceleration.

**18-** When you sit in a car that suddenly stops, your body leans forward due to... ..

inertia.

**19-** Elastic collision is the collision that keeps both body's... ..... and body's ... ..

velocity, kinetic energy

**20-** In elastic collision between two objects, the relative velocity of the two objects after the collision is.....their relative velocity before collision

equal to.





21- In elastic collision, no constant..... occurs in colliding objects.  
change.

22- If two objects of equal mass collide with perfect elastic collision, their velocities..... after Collision  
equal.

23- In inelastic collision, a loss of energy occurs in the form of ... .... Or.....  
heat or sound.

24- Air hockey is a fun game in which..... is used Circular in the push of... ....  
It slides on a smooth table with holes through which a constant stream of air rushes  
to reduce ..... between the disc and the table.  
two round paddles, a light disc, friction.

25- When balanced forces act on an object, the body... .....while when  
unbalanced forces affect the same body it... .....  
remains in its state, changes its state.

26- Unit of force measurement is... .., the speed measurement unit is... .....  
while the acceleration measurement unit is... .....  
newton, meter/second (m/s), meter/second<sup>2</sup> (m/s<sup>2</sup>) or newton/ Kg (N/kg).

27- If the resulting force is not equal to zero, so the force is... .....  
unbalanced.

28- It is recommended to wear a ... ..... when driving a car  
seat belt.

29- ..... allows the user to fly in the air upwards as the water rushes down through  
Its openings.  
Flyboard.

30- ... ..... works by pushing air from the motors downwards, which is followed  
by pushing the air upwards with equal force.  
drone.

31- In a chemical reaction, bond breaking is a..... is a process, while forming  
bonds is a .....process.  
endothermic, exothermic.



**32-** The reactions that are accompanied by the release of heat energy from the system to the surrounding medium are called..... reactions  
**exothermic.**

**33-** In the energy diagram of the endothermic reaction, the energy of the products is..... the energy of the reactants.  
**higher than.**

**34-** The "thermite" reaction is used in..... and it is ..... reaction  
**welding railroad tracks, exothermic.**

**35-** The "conservation law of energy" states that energy does not.....or..... from nothing, but it can be converted from one form to another.  
**be created, be destroyed.**

**36-** In a lemon battery .....energy stored in lemon juice is converted to ..... energy  
**chemical, electrical.**

**37-** Atmospheric air is composed of nitrogen gas by .....% and Oxygen gas by.....%.  
**78, 21.**

**38-** Ethanol is a..... fuel, while hydrogen is a.....fuel.  
**biofuel, synthetic fuel.**

**39-** The process that leads to an increase in the oxygen content of a substance is called ..... process.  
**oxidation.**

**40-** The substance that removes oxygen or gives hydrogen is called the ..... factor  
**reducing agent.**

**41-** The temperature of the "oxyacetylene" flame reaches.....°C, used in cutting.....  
**3000, metals.**



42- The amount of force is measured in a unit called....., while the acceleration is measured in units of.....

newton,  $\text{m/s}^2$  or  $\text{N/kg}$ .

43- The law that explains that an object remains as it is in terms of rest or motion unless it is affected by a force is called the law of.....

inertia/ newton's first law

44- In the..... collision, there is no loss of energy, and the velocity is transferred from the moving object to the stationary object completely.

elastic.

45- The mathematical formula for Newton's second law is:  $(F) = \dots\dots\dots \times \dots\dots\dots$

mass  $\times$  acceleration ( $M \times a$ )

46- Every action has an equal reaction in..... and opposite in .....

magnitude, direction.

47- The property of the body's resistance to changing its dynamic state is known as .....

inertia.

48- Levers make tasks easier by..save time .... and...save effort .....

49- The crowbar is a ..first..... class lever, while the manual broom is a....third..... class lever

50- The lever is in a state of equilibrium when the moment of the effort and the moment of load are..equal....

51- A machine saves effort when its mechanical advantage value is greater than...one..

52- Increasing the length of the effort arm leads to ....save effort.....

53- Second class levers are different from third class levers in ...presence of load in the middle.....

54- Examples of levers that increase speed ...tennis racket.....

55- First class levers save effort when.....effort arm..... is longer than ..load arm.....

56- The effort arm equals the load arm in ..first..... levers.

57- The most common type of levers is the ...first....class.





58- If the applied effort is half the load value and the load arm is 50 cm, then the effort arm equals....100... cm.

59- After fertilization, the ovary develops into a ...fruit..... while the ovules develop into ....seeds..

60- The floral whorl that protects the inner parts of the flower before blooming is the.... calyx

61- Examples of unisexual flowers are the ...palm ..... plant and the ....corn..... plant.

62- Winds are deflected to the right in the ..northern..... Hemisphere.

63- A low-pressure area is represented by the symbol...L..... and the color red

64- Air moves from areas of ...high ..... pressure to areas of ...low.... pressure.

65- The deflection of winds caused by Earth's rotation is called the...coriolis..... effect.

66- At the equator, wind paths are straight line

67- Air currents in a low-pressure area ...rise, condense.... leading to cloud formation.

68- Air currents in a high-pressure area ...descend, dry ... leading to dry and clear weather

### Q7: What is meant by?

1- The fuel

Fuel: Flammable material that produce thermal energy when it is burned

2- Ignition point

Ignition point: the temperature at which the material begins to ignite.

3- Oxidization

Oxidation: Chemical process at which increase oxygen percentage or decrease hydrogen percentage

4- Reduction

Reduction: Chemical process at which decrease oxygen percentage or increase hydrogen percentage



**5- The oxidizing agent**

Oxidizing agent: the substance that gives oxygen to, or takes hydrogen away from another substance during a chemical reaction.

**6- The reducing agent**

Reducing agent: the substance that takes oxygen from, or gives hydrogen to another substance during a chemical reaction.

**7- Winds.**

The horizontal movement of air across the earth surface caused by difference in atmospheric pressure between regions due to unequal heating of the earth surface

**8- Coriolis effect.**

The deflection of winds caused by Earth's rotation

**9- Isobars.**

They are curved lines connecting points of equal atmospheric pressure at sea level

**10- Low-pressure system (L).**

It is a region where the atmospheric pressure value at its center is lower than that in the surrounding areas

**11- The Weather Kiosk (Stevenson's Kiosk).**

An instrument shelter designed to protect meteorological instruments (such as thermometer, barometer) with still allowing air to circulate

**12- Weather forecasting.**

The process of predicting the future weather conditions for a certain location

**13- Radiosonde.**

A device is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere

**14- Meteorological buoys.**

Buoys used to collect data in oceans and transmit it via satellites



**15- High-pressure system.**

It is a region where the atmospheric pressure value at its center is higher than that in the surrounding areas

**16- Khamaseen winds.**

Storms loaded with sand and dust blow over Egypt in the spring season

**17- What is meant by a cancerous tumor?**

Abnormal and repeated cell growth formed when a somatic cell undergoes uncontrolled mitotic division

### **Q8: What is the importance of**

**1- The fuel**

produce thermal energy as a result of combustion.

**2- Using the sand or foam to extinguish some fires**

extinguish fires by isolating oxygen from the fire; sand is especially used for some metal fires.

**3- Oxyacetylene flame**

It is used for cutting and welding metals such as steel and copper.

**4- Evacuating air from preservation bags when preserving food in them.**

provide a poor-oxygen environment that minimizes redox reactions and preserves food from spoiling.

**5- Fire extinguishers**

extinguish fires, mainly by smothering or isolating oxygen from the fire.

**6- Spark plugs**

produce spark to ignite the mixture of gasoline and air in the car engine.

**7- Lever:** perform tasks easily by increasing force, speed and save time, effort

**8- Forceps:** third class lever that pick tiny objects accurately

**9- Crowbar:** first class lever that increase force

**10- What is the importance of mitosis in humans?**

Body growth / repair damaged tissues

**11- What is the importance of meiosis in humans?**

Production of gametes in gonads





### Q9: Problems

1- A person pulled a 10 kg block box with a force of 50 N on a horizontal frictionless surface. How much acceleration does the box move?

$$a = F \div m = 50 \div 10 = 5 \text{ m/s}^2.$$

2- An object with a mass of 15 kg is placed on the ground. How much force is needed to lift it vertically? (Note that the acceleration of gravity = 10 m/s<sup>2</sup>)

$$F = m \times a = 15 \times 10 = 150 \text{ N}.$$

3- A type of first class lever had a force of 40 N and a effort arm of 5 cm. It affected a load of 100 N.

Calculate the length of the load arm? Does the lever save effort or not?

$$\text{Effort force} \times \text{its arm} = \text{load force} \times \text{its arm}$$

$$40 \times 5 = 100 \times \text{its arm}$$

$$40 \times 5 / 100 = 2 \text{ cm}$$

It saves effort

4- **Imagine** trying to break a hard hazelnut shell and you have to choose between two similar crushers, one of which has a longer hand than the other.

Determine: What kind of levers is the nutcracker? And how does it work?

Second class lever , it increases force

Which two crushers will you use?

The longer hand crusher

Where do you put the hazelnut for the arms?

Between effort force and fulcrum

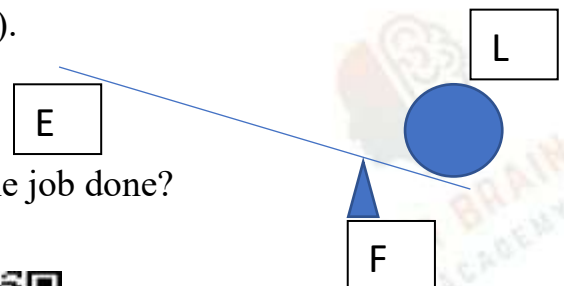
5- **Imagine** trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum. (Explain your answer with a drawing).

1- What type of levers will be used?

First class lever – crowbar

2- Will you choose a long or short column to get the job done?

long column



3- Where will you put the small stone in relation to the huge rock?

In the middle between load and effort , nearer from load

6- A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.

1- Is this lever balanced? and why?

Effort force x its arm =  $30 \times 20 = 600$

load force x its arm =  $20 \times 10 = 200$

unbalanced lever because moment of effort isn't equal to moment of load

2- If the lever is unbalanced, what is the length of the load arm that achieves balance?

Load arm = effort \*its arm /load =  $30 \times 20 / 20 = 30$  cm

7- Using the following table, find the value of x, y and state the law of levers.

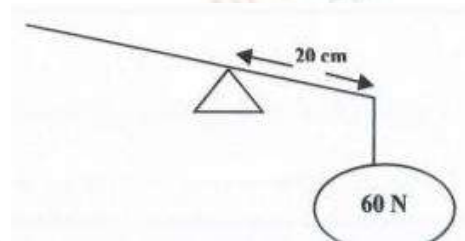
| Effort (Newton) | Effort Arm (cm) | Load (Newton) | Load Arm (cm) |
|-----------------|-----------------|---------------|---------------|
| X               | 5               | 1             | 10            |
| 4               | 5               | 2             | Y             |

$X = 1 \times 10 / 5 = 2\text{N}$

$Y = 4 \times 5 / 2 = 10$  cm

8- In the corresponding figure:

On what dimension of the fulcrum does a load of 30 N is hanged, to balance the lever?



Effort force x its arm = load force x its arm

$20 \times 60 / 30 = 40$  cm



### Q10: Practical Questions

1- If a light ball is replaced by another heavy one, which ball will be affected more? Why?

The light ball is affected more, because it gains greater acceleration due to its smaller mass and lower inertia.

2- A person pushes the wall, why doesn't the wall move despite pushing?

Because the wall exerts an equal and opposite in direction, so net force is zero

3- A car moving at a constant speed on a straight road Which law explains this?

Newton's first law.

4- When jumping out of the boat, the boat moves backwards Which law makes this clear?

Newton's third law.

### Q11: Write the scientific term

1- A fixed point on which a rigid bar rests **fulcrum**

2- Levers where the fulcrum between effort and load. **First class levers**

3- Levers where the effort is between the load and the fulcrum point. **Third class levers**

4- Levers where the load is between the effort and the fulcrum point. **Second class levers**

5- The distance between the weight representing the load and the fulcrum point. **Load arm**

6- Specialized cells responsible for sexual reproduction in living organisms. **Gametes**

7- Reproduction that occurs through two parent individuals of the same species, one male and the other female. **Sexual reproduction**

8- The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote that carries the full number of chromosomes (2n). **Fertilization**

9- The transfer of pollen grains from the anthers of a flower to the stigmas of another flower on a different plant of the same species. **Cross pollination**

10- A short stem whose leaves are modified to carry out reproduction in the plant. **Flower**

11- A cell formed by the fusion of the egg nucleus, containing (2N) chromosomes. **Zygote**

12- The unit of structure and function in living organisms. **Cell**





**13-** A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction. [Reproduction](#)

**14-** The male reproductive organ in the flower, consisting of several stamens. [Androecium](#)

**15-** The state of the atmosphere at a specific place over a short period of time. [Weather](#)

**16-** The prevailing state of the atmosphere at a specific place over a long period of time. [Climate](#)

**17-** The highest temperature in one day. [Maximum temperature](#)

**18-** The lowest temperature in one day. [Minimum temperature](#)

**19-** The weight of a column of air with a cross-sectional area of 1 m<sup>2</sup> and a height equal to the height of the atmosphere. [Atmospheric pressure](#)

**20-** The amount of water vapor present in the air. [Humidity](#)

**21-** The actual mass of water vapor present in a given volume of atmospheric air. [Absolute humidity](#)

**22-** Predicting future weather conditions in a certain place. [Weather forecasting](#)

**23-** A white wooden box with slanted openings that protects temperature-measuring instruments. [Stevenson screen](#)

**24-** A device is carried by a balloon to measure temperature, pressure, and humidity in the upper layers of the atmosphere. [Radiosonde](#)

**25-** Buoys used to collect data in oceans and transmit it via satellites. [Weather buoys](#)

**26-** Satellites that rotate around the Earth to provide comprehensive weather images and data. [Meteorological satellite](#)

**27-** Seasonal winds in Egypt carrying sand and dust and affecting health. [Khamaseen wind](#)

**28-** A gas used in radiosonde balloons because of its light weight. [Helium](#)

**29-** The symbol used on maps to represent "thunder and lightning."



30- The symbol used to represent "snowfall."



31- The altitude at which the radiosonde balloon bursts (in kilometers). 20-35

**Q12: Choose the odd word out, and then state the relationship between the remaining ones:**

1- Zucchini - Date palm - Tomato – Maize unisexual

2- Stigma - Style - Ovary – Filament carpel structure

**Q13: Put (✓) or (X)**

1- Winds move in completely straight paths from the poles to the equator. F

2- Wind speed increases when the difference in atmospheric pressure is large. T

3- In the Northern Hemisphere, winds rotate around the center of a low-pressure system anticlockwise direction. T

4- Cold, moist air in polar regions forms a high-pressure area. F

5- The Coriolis effect is responsible for winds moving in curved paths. T

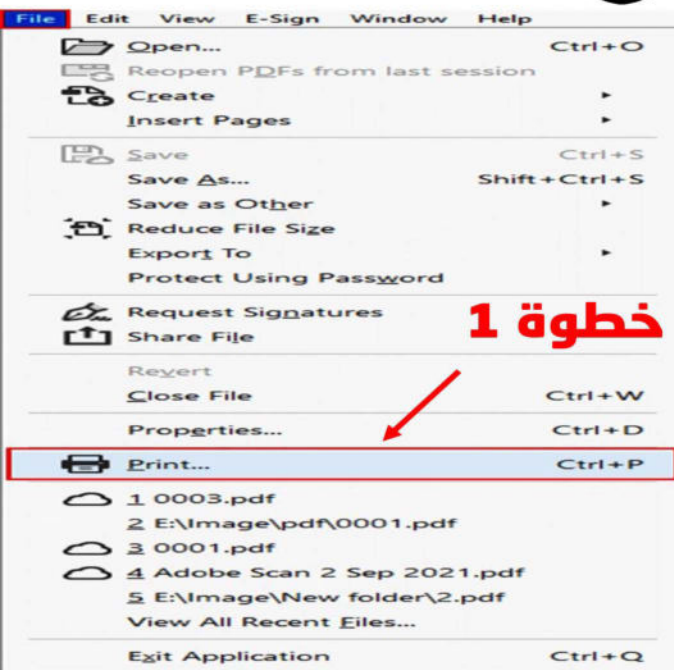
6- Lines of equal pressure are called isobars. T

7- At the center of a low-pressure system, pressure values are higher than in surrounding areas. F

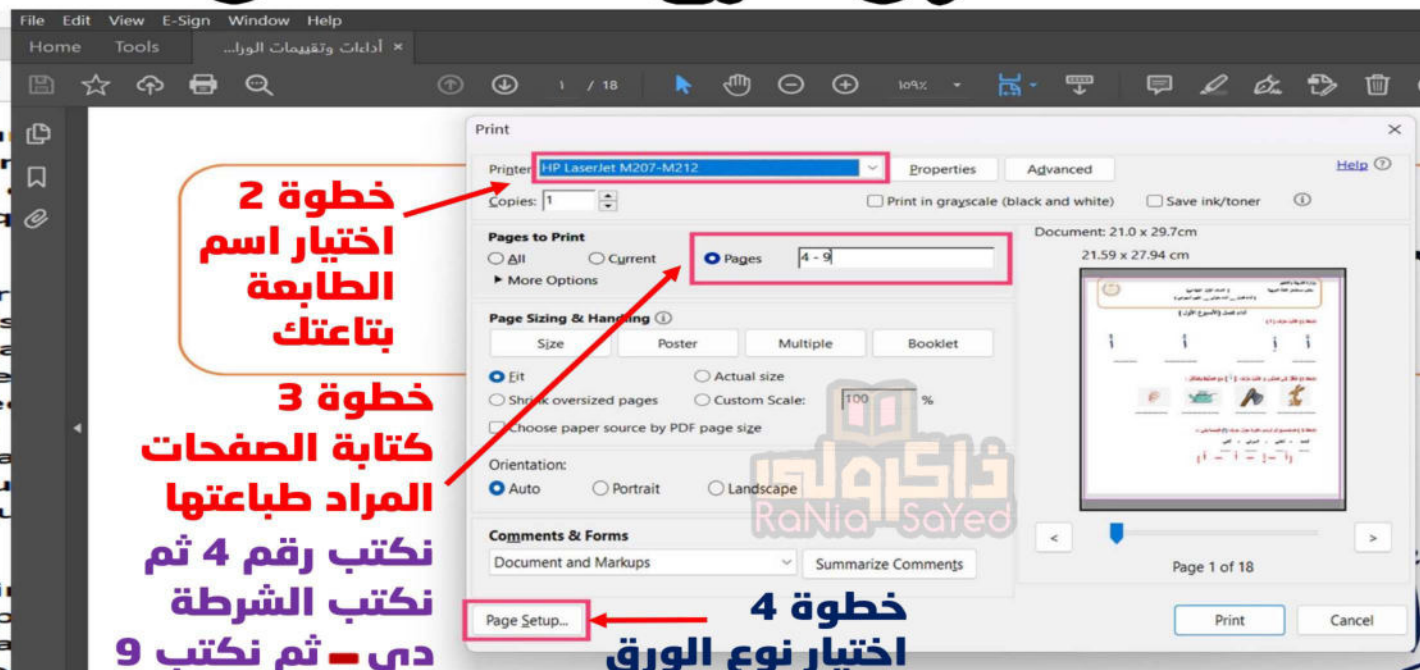


# كيفية طباعة صفحات معينة من ملف معين

## مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



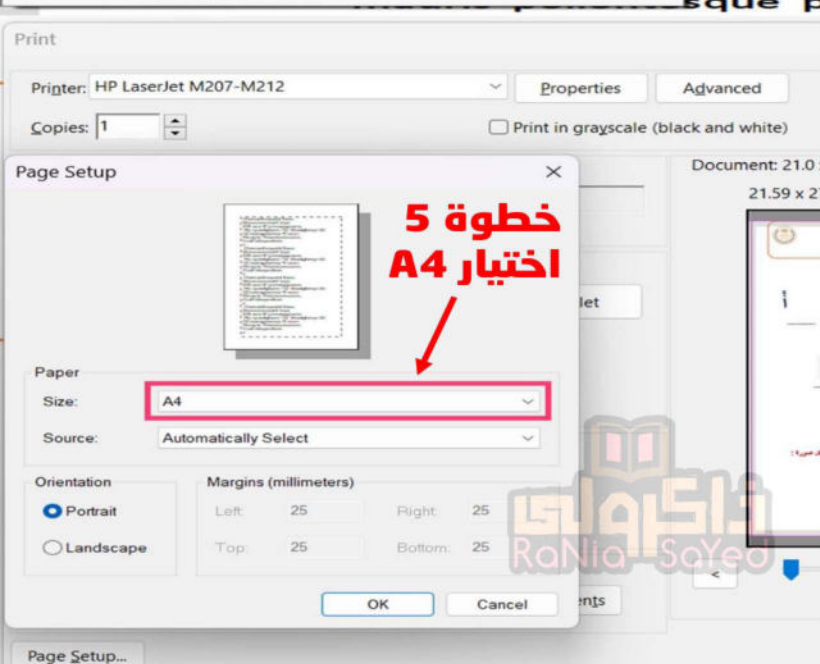
خطوة 1



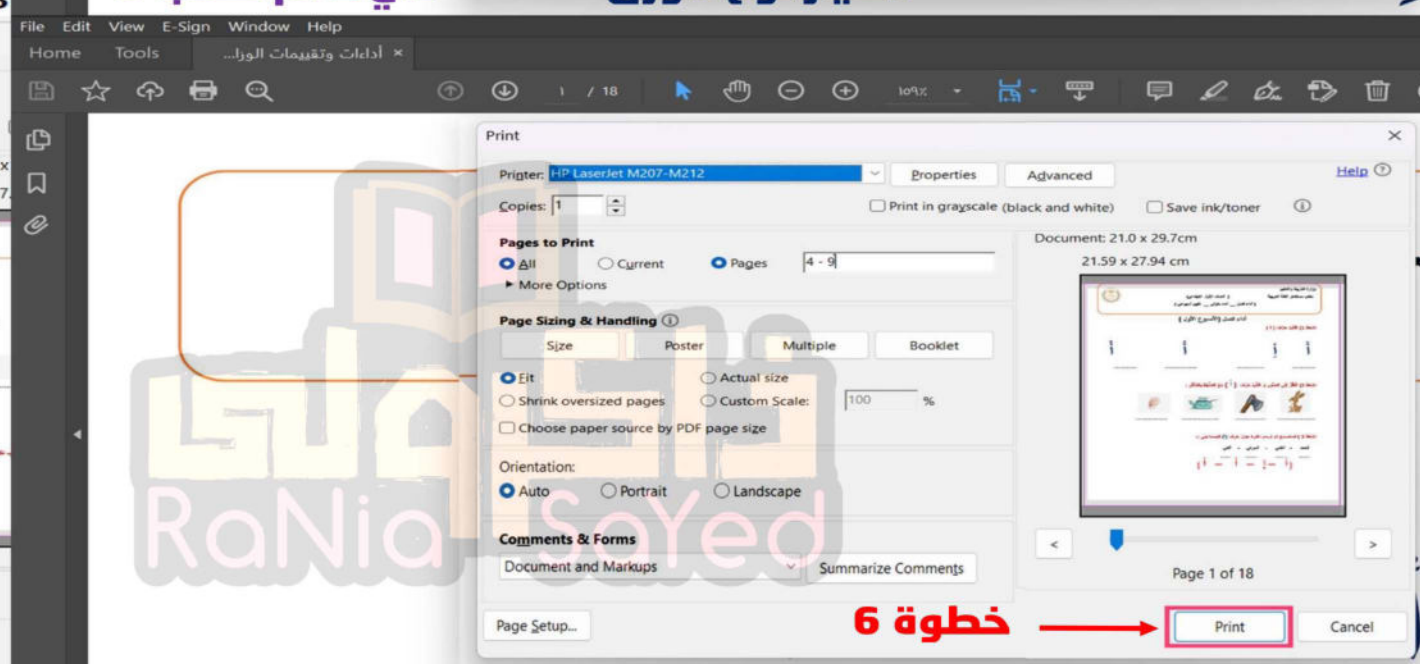
خطوة 2  
اختيار اسم  
الطابعة  
بتاعتك

خطوة 3  
كتابة الصفحات  
المراد طباعتها  
نكتب رقم 4 ثم  
نكتب الشرطة  
دي - ثم نكتب 9

خطوة 4  
اختيار نوع الورق



خطوة 5  
اختيار A4



خطوة 6